JOURNAL
of the
American Veterinary Medical Association

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A. V. M. A. MEMBERSHIP

Confucius once said, "No great truth was ever impressed upon a large number of people except by repetition." This editorial, therefore, on a time-worn subject, is prompted by the urgent need for a greatly increased membership in our national association.

Your officers of the American Veterinary Medical Association believe that if all of the advantages to ethical veterinarians of a one hundred per cent membership in the national association were understood, not a single qualified applicant would hesitate to apply for membership.

As a preface to a discussion of these possible advantages, let us quote article 2 of the Constitution and By-laws of the A. V. M. A.

ARTICLE 2, SECTION 2

The purpose of this Association shall be:

(a) To protect and promote the professional interests of the veterinarian.

(b) To elevate the standard of veterinary education.

(c) To procure uniform laws and regulations governing veterinary practice and the control of diseases of animals, including poultry.

(d) To direct public opinion regarding problems of animal, including poultry, hygiene.

(e) To promote good fellowship in the profession.

Let us now consider paragraph "a" of Section 2 which states, "To protect and promote the professional interests of the veterinarian." This is the primary purpose for which every professional organization exists. But why is it that some national professional organizations progress farther than others? A study of the constitution and by-laws of various types of

national associations, (professional, commercial and service) together with an analysis of comparative results, furnishes a clue that might help us with the problem. Such a study clearly shows that, other things being equal, the success of national organizations is in direct ratio to the percentage of members of state and local associations who belong to the national body. The writer is personally familiar with the situations in only two states. In both instances less than half of the members of the state associations are also members of our national organization. One wonders why this condition prevails, in view of the fact everyone recognizes that, "In unity there is strength."

The obvious answer seems to be that members of state and local veterinary associations, who are not members of the national body, feel that the A. V. M. A. to which they do not, but should belong, has not warranted their support.

That this is a reasonable hypothesis is indicated by the fact that the Special Reorganizing Committee of the Executive Board, after thorough study of this particular situation, has taken constructive steps to stimulate greater interest in membership. One of these steps was to revamp the JOURNAL, which appeared in its new format beginning with the July issue. It is the hope of the Committee to develop publications that will be of real service to each of the widely divergent interests that are recognized as included in the membership of this Association. For one thing, it is planned to present each month to our readers "a picture of the passing show," indicating the trends in various matters pertaining to professional veterinary medicine emphasizing, of course, the control and treatment of animal diseases. This should be monthly information that no veterinarian, regardless of his special field of interest, can afford to be without.

Such evidence of new policies, along with the knowledge that the executive officers of the A. V. M. A. are definitely pledged to develop the national organization toward providing that intangible thing called *service* to all branches of the profession, should bring about an increase in interest and membership. Such an increase is vital to the carrying out of future plans in the interest of the entire veterinary profession. It is only with the wholehearted cooperation of the entire A. V. M. A. membership that ultimate success can be attained.

E. A. R.

ANNOUNCEMENT

Dr. E. A. Rodier, who filled the position of Secretary Editor while Dr. Hoskins attended the Thirteenth International Veterinary Congress, has been appointed Acting Business Manager of the JOURNAL with additional duties as Secretary in charge of Association affairs. Dr. H. Preston Hoskins was appointed Editor and Head of a newly created Department of Publications. Both appointments became effective on September 15, 1938. Dr. Hoskins is scheduled to resume his duties as editor with the November issue.

EQUINE ENCEPHALOMYELITIS SURVEY

In line with our new editorial policy of presenting to readers of the JOURNAL each month a "picture of the passing show" regarding trends toward control, eradication or spread of communicable animal diseases, we will, in the November issue of this JOURNAL, present a survey of the equine encephalomyelitis situation which we believe will be of particular interest to our readers.

Dedication

This issue of the JOURNAL is dedicated to deans and members of faculties of the twelve recognized veterinary colleges in the United States and Canada. It is to them that we look to formulate programs which will be continuously carried out during college attendance that will be as effective as the one used at Colorado State College last year whereby 14 new members were vouched for by Dean Newsom and his enthusiastic coworker, Dr. James Farquharson, from a graduating class of 16.

AN AMERICAN VETERINARIAN IN CHINA

A few years ago Marshal Pei Tsung-Hsi, brilliant military strategist, now Generalissimo Chiang Kai-Shek's Chief of Staff, decided to organize an air force as a branch of the Kwangsi army. For that purpose, he engaged the services of several British aviators to teach aviation and aerial combat. At the time the writer first went to Kwangsi, it happened that one of these British aviators was killed, due to a failure of his airplane motor. As he was so well liked, the Chinese decided to pay him the unusual honor of giving him a Buddist funeral before sending his remains to Hong Kong for transshipment to England. Because of his official position, the writer was invited to attend the ceremony, an experience that will remain long in his memory.

The Kwangsi Army airport is located at Lin Chow, a little valley in the northern part of the province, entirely surrounded by high mountains, with but one entrance, closely guarded by trained troops. Probably no other white man, except the British aviators, has ever entered this mountain fastness.

The party consisted of the Marshal, his Aide, the Governor, the Commissioner of Finance and the writer. We rode in an armored car with bullet-proof glass, an armed guard beside the driver and three armed soldiers on each running board holding to brass rails attached to the top of the sedan. This car was convoyed by an automobile loaded with soldiers in front and another in the rear.

Upon arriving at the Lin Chow airport, just before daybreak, we found that an outdoor structure had been built similar to the bandstands in our public parks, but with three sides boarded in. In the center of the rear wall was hung a life-size portrait of the British aviator whose funeral was to be solemnized. On the remaining part of the rear wall and the two side walls, streamers about eight inches wide by about nine feet in length, white in color and painted with Chinese characters in gilt were hung. These were expressions of sympathy from friends. In front of the portrait stood a table about six feet in length and about one foot in width, upon which were placed two large candles, partially burned and out, evidently indicating the untimely death. On this same table, between the candles and at either end, bunches of joss sticks were burning, a tribute to the departed spirit. On the table were also placed rice and Chinese wine, food and drink for the departed spirit.

In front of this narrow table and separated from it by about two feet, was placed another table about two feet in width and also about six feet in length. On this table were placed three young animals, dead, closely shaven, and resting on the outer thoracic and abdominal walls with their heads facing the altar. They were a lamb, a calf and a shoat, a sacrifice of the elementary things of life.

The guests sat along the left side wall. To the rear of the right side wall, a Chinese orchestra was placed and to the front, a Buddist priest, who read the funeral ceremony from a Chinese book, evidently the equivalent of our Christian bible. The funeral ceremony was not preached by the Buddist priest, but was given by the Marshal, followed with sermons by the Governor, the Commissioner of Finance and a British aviator who gave his talk with the aid of an interpreter. In front of the funeral ceremonial stand and nearest to it was massed the aviation corps. Chinese regular troops were placed to the rear and in back of them the Chinese populace looked on.

This funeral ceremony, which lasted about half an hour, took place just at sunrise. It was a perfectly clear day and so the varying colors of a rainbow could be seen on the sides of the mountains, near and far. One of them, known as the "Painted Mountain," contained patches of bare sandstone which reflected the sunlight like a million diamonds. With a background of little Chinese farms, the restful, pastoral quiet but added to the solemnity of the occasion.

E. A. R.

COMING VETERINARY MEETINGS

Southwestern Minnesota Veterinary Medical Association. Lakefield, Minn. September 27, 1938. Dr. Louis E. Stanton, Secretary, Jackson, Minn.

New England Veterinary Medical Association. Concord, N. H. October 3-4, 1938. Dr. H. W. Jakeman, Secretary, 44 Bromfield St., Boston, Mass.

Southern California Veterinary Hospital Association of. Los Angeles, Calif. October 4, 1938. Dr. L. B. Wolcott, Secretary, 1434 W. Slauson Ave., Los Angeles, Calif.

Illinois Veterinary Conference, University of. University of Illinois, Urbana, Ill. October 5-7, 1938. Dr. Robert Graham, University of Illinois, Urbana, Ill.

New York City, Veterinary Medical Association of. Hotel New Yorker, 8th Ave. and 34th St., New York, N. Y. October 5, 1938. Dr. J. B. Engle, Secretary, Box 432, Summit, N. J.

Dallas-Fort Worth Veterinary Medical Society. Fort Worth, Texas. October 6, 1938. Dr. H. V. Cardona, Secretary, 2736 Purington Ave., Fort Worth, Texas.

Houston Veterinary Association. Houston, Texas. October 6, 1938. Dr. E. G. Pigman, Secretary, 4206 Polk Ave., Houston, Texas.

Chicago Veterinary Medical Association. Hotel Sherman, Chicago, Ill. October 11, 1938. Dr. O. Norling-Christensen, Secretary, Box 12, Wilmette, Ill.

West Virginia Veterinary Medical Association. Kanawha Hotel, Charleston, W. Va. October 11-12, 1938. Dr. J. H. Rietz, Secretary, Oglebay Hall, West Virginia University, Morgantown, W. Va.

Washington State Veterinary Medical Association. Chamber of Commerce Auditorium, Yakima, Wash. October 15. Dr. V. C. Pauhlman, Secretary, 1524 5th St., Chehalis, Wash.

Saint Louis District Veterinary Medical Association. Melbourne Hotel, Saint Louis, Mo. October 12, 1938. Dr. J. P. Torrey, Secretary, 610 Veronica Ave., East Saint Louis, Ill.

Southeastern Michigan Veterinary Medical Association. Medical Arts Building, 3919 John R. St., Detroit, Mich. October 12, 1938. Dr. F. D. Egan, Secretary, 17422 Woodward Ave., Detroit, Mich.

Eastern Iowa Veterinary Association, Inc., Hotel Montrose, Cedar Rapids, Iowa. October 18-19, 1938. Dr. H. E. Tyner, Secretary, New London, Iowa.

Purdue University Veterinary Short Course. Purdue University, Lafayette, Ind. October 18-21, 1938. Dr. R. A. Craig, Department of Veterinary Science, Purdue University, Lafayette, Ind.

International Association of Milk Sanitarians. The Allerton, Cleveland, Ohio. October 19-21, 1938. Mr. C. Sidney Leete, Secretary, Department of Health, Albany, N. Y.

Florida State Veterinary Medical Association. Miami, Fla. October 24-25, 1938. Dr. J. V. Knapp, Secretary, The Capitol, Tallahassee, Fla.

Interstate Veterinary Medical Association. Warrior Hotel, Sioux City, Iowa. October 25-26, 1938. Dr. J. V. Knapp, Secretary, The Capitol, Tallahassee, Fla.

International Livestock Exposition. International Amphitheater, Chicago, Ill. November 26-December 3, 1938.

APPLICATIONS FOR MEMBERSHIP

FIRST LISTING

AKINS, EVERETT H.
6825 Pearl St., Jacksonville, Fla.
D. V. M., Ohio State University, 1937. Vouchers: T. H. Applewhite and LeRoy T. Fisher.

ANDERSON, DAN J.
1619 S. Laredo St., San Antonio, Texas.
D. V. M., Texas A. and M. College, 1938. Vouchers: Matthew E. Gleason and Chas. W. Neal.

BRILLHART, CARL E.
1124 S. 31st St., Apt. 4, Omaha, Neb. D. V. M., Colorado State College, 1935. Vouchers: J. N. McIlnay and I. E. Newson.

DOW, H. G.
1030 Ave. C., Fort Madison, Iowa. D. V. M., Iowa State College, 1924. Vouchers: H. D. Bergman and Chas. Murray.

EDGETT, JAMES A.
379 New Park Ave., Hartford, Conn. V. S., B. V. Sc., Ontario Veterinary College, 1938. Vouchers: T. E. Corwin and E. R. Dimock.

GOULD, CLINTON L.
Fort Missoula, Mont. B. S., D. V. M., Washington State College, 1938. Vouchers: E. A. Tunnicliff and Stuart M. Dingwall.

HARKAVY, H. J.
Box 234, Nowata, Okla. B. Sc., Kansas State College, 1936. D. V. M., Kansas State College, 1938. Vouchers: R. R. Dykstra and L. J. Allen.

LEVINE, P. P.
New York State Veterinary College, Ithaca, N. Y. B. S., College, City of New York, 1927. D. V. M., New York State Veterinary College, 1932. M. S., Cornell University, 1932. Ph. D., Cornell University, 1937. Vouchers: W. S. Monlux and E. L. Brunett.

RAWLS, BENJAMIN H.
Box 804, Daytona Beach, Fla. D. V. M., Alabama Polytechnic Institute, 1933. Vouchers: J. H. Yoder and G. M. McFadden.

SAMPSON, JESSE
University of Illinois, Urbana, Ill. B. S., University of Illinois, 1923. D. V. M., Cornell University, 1930. Ph. D., Cornell University, 1933. Vouchers: Robert Graham and C. A. Brandly.

SARASOHN, J. JEWELL
5791 Westminster Place, Saint Louis, Mo.
A. B., Washington University, 1934. B. Sc., Kansas State College, 1936. D. V. M., Cornell University, 1937. Vouchers: J. V. Lacroix and S. W. Haigler.

STEPHENS, CLAYTON
Tupelo, Miss. D. V. M., Albama Polytechnic Institute, 1938. Vouchers: R. L. Mundhenk and J. E. Greene.

SUTHERLAND, JOHN WM.
Pembroke, West, Bermuda. V. S., B. V. Sc., Ontario Veterinary College, 1935. Vouchers: C. D. McGilvray and C. J. Cooper.

WELNHOFER, JOHN
2954 N. Menard Ave., Chicago, Ill. D. V. M., Iowa State College, 1930. Vouchers: V. V. Golden and S. W. Haigler.

WOOD, ARMOUR C.
2031 S. Broad St., Trenton, N. J. V. M. D., University of Pennsylvania, 1938. Vouchers: R. A. Hendershott and J. G. Hardenbergh.

Applications Pending

SECOND LISTING

(See September, 1938, JOURNAL)

CHRISTOFFERSON, FRANKLIN F.
Snohomish, Wash.
B. S., D. V. M., State College of Washington, 1937. Vouchers: E. E. Wegner and J. E. McCoy.

COPE, RUSSELL P.
1205 San Pablo Ave., Berkeley, Calif.
D. V. M., Kansas State College, 1936. Vouchers: S. T. Michael and John McInnes.

GOCHENOUR, RAYMOND B.
705 Varnum St. N. W., Washington, D. C.
V. M. D., University of Pennsylvania, 1937. Vouchers: W. S. Gochenour and H. W. Schoening.

GOCHENOUR, WILLIAM S., JR.
705 Varnum St. N. W., Washington, D. C.
V. M. D., University of Pennsylvania, 1937. Vouchers: W. S. Gochenour and H. W. Schoening.

JUNG, OTTO E.
1417 E. 54th St., East Saint Louis, Ill.
D.V.S., Kansas City Veterinary College, 1908. Vouchers: Charles Barnes and G. H. Bruns.

OSTERHOLTZ, WILBERT E.
4332 Hartford St., Saint Louis, Mo.
D. V. M., Kansas State College, 1935. Vouchers: F. R. Koutz and S. T. Michael.

RACOFF, HERBERT
408 State Office Bldg., Columbia, S. C.
D. V. M., Cornell University, 1937; M. S., Ohio State University, 1938. Vouchers: W. A. Hagan and Leonard W. Goss.

SPLAVER, DAVID
241 E. Highland Ave., Tracy, Calif.
D. V. M., Ohio State University, 1937. Vouchers: J. F. Claire and S. T. Michael.

The amount which should accompany an application filed this month is $6.25, which covers membership fee and dues to January 1, 1939, including subscription to the JOURNAL.

Veterinary Medicine in Mexico*

By FRANCISCO MOGUEL, *Mexico City, Mexico*

The history of veterinary medicine in Mexico is somewhat obscure, as it goes far back into past years. At first, our profession developed slowly because it had to struggle along little by little to overcome the great obstacles that presented themselves in all its various stages. For some time the veterinarian was not given the place to which he was justly entitled. The tendency was to consider him as belonging to the class of empirics found everywhere. However, with patient resignation he went on demonstrating his knowledge. Although his field of action, because of conditions at that time, was limited almost exclusively to the army and to private practice, he never lost sight of the wide horizons within which our great profession is demonstrating to the world its immense value to the progress and well being of humanity. It is a profession that does not exploit the individual, nor does it thrive on human suffering. On the contrary it is altruistic, developing only those fountains of wealth which give to man his principal elements of life, guarding and controlling the purity of all food products of animal origin. In addition, the veterinary profession protects the human species from the calamity of diseases which constantly threaten and which its watchfulness holds in check.

On February 22, 1854, the government, having need of veterinarians and agronomists, founded an agricultural and veterinary school in the federal district of San Jacinto for educating specialists. In the beginning this was done under the direction of the department of agriculture and fomento. On February 25, 1862, the first graduate, Dr. José de la Luz Gómez, received his degree. One of the very earliest graduates was the distinguished and unforgettable Dr. José Mota, profound and wise anatomist, who imparted his knowledge to many of the present generation, dedicating himself until the last years of his life to teaching various branches of veterinary medicine.

Because of political upheavals, the old school of agriculture and veterinary science was closed in 1914, but on May 4, 1916, the National School of Veterinary Medicine, independent and better organized, opened its doors on the same location. In view of its great development, large extensions were necessary. In 1924 this school was transferred to Merced de las Huertas, D. F., a place near its previous location. For the same reason, in 1928, it was transferred to the Plaza de Santa Catarina in Coyoacán, D. F., where it is at present located. Commodious class rooms, laboratories, amphitheaters, fields for sports and, in general, all necessary facilities are now available.

On May 23, 1929, when the University of Mexico became autonomous, the veterinary school became affiliated with that institution. By this time, the veterinary school was conferring the doctorate degree. In the ceremony of incorporation the chancellor of the university stated in his address that the university could not be complete without including the faculty of veterinary medicine with its brilliant history of great usefulness to the country.

The college has constantly striven to make the studies pursued by veterinary students more complete. At present, students are first required to secure their bachelor's degree and then pursue their professional studies for six years. Great attention is given to all the basic subjects without neglecting any of the others that constitute the profession as a whole. Special attention is given to work in the clinics and laboratories, so that when students leave the college they may be capable of solving their own problems. There is a hospital at the veterinary school for such work as the college has available. A chief of clinics furnishes the professors with cases as required. The public brings sick animals to this clinic. A

*Received for publication, October 7, 1937.

small charge is made only for medicine and feed. Two years ago steps were taken to provide a stable for the study of feeds and feeding, animal hygiene, the handling of milk and the industrialization of its products.

Because livestock represents so large a part of the resources of our country, its protection is of paramount importance. Veterinary students are therefore given special training in preventive medicine and livestock sanitation. They are sent into the field in various parts of the republic to study problems as they arise and to take measures accordingly. The faculty of the college of veterinary medicine is quite complete, only professors of wide experience being employed. All of them have taken an active part in the development of our profession. To them we are in a large measure indebted for that development. The qualification requirements for professors are quite severe, at least five years of active professional practice and recognized competence being a prerequisite to passing competitive examinations.

The constant need for veterinarians in my country has caused the government to furnish the most ample facilities for their education and training. Almost all students are given scholarships and, in addition, cash allowances. As a further inducement to advancement in their studies, they are given employment of various kinds which assists them to sustain themselves while putting into practice the knowledge they are acquiring. In this way, little by little, they add to their experience as they are principally employed as assistants in the laboratories, clinics, amphitheater, stables, abbatoirs, and packing-houses. Consequently, when they obtain their degrees, they already have had experience in almost all the branches of their professional work and have acquired a love for the profession which they will practice.

As I said in the beginning, the veterinarians' sphere of activity in times past was very much restricted. At present, however, it is sufficiently broad as the projects that have been carried forward for a little more than a decade by the Direction de Ganadéria have opened new fields of activities. The services of veterinarians are now utilized in sanitary inspection in ports and on the frontiers in campaigns against tick fever, infectious abortion and tuberculosis. In fact, all veterinarians are now employed in every capacity that relates to the betterment of the livestock industry. The difficult economic conditions through which we are passing at present has made necessary an intensification of all these lines of work.

For a good many years there existed in the central experiment station of the department of agriculture and fomento a small division which occupied itself with the livestock problems of the country in which there was a small number of veterinarians. Little by little, this small division grew. Later, when the Bureau of Agriculture was formed, it became a department of that bureau. Through the loyalty and enthusiasm of many successive leaders, this department developed more and more, so that a little later there was formed the Bureau of Agriculture and Livestock. Finally, the increasing need resulting from development of the livestock industry obligated the government, in 1922, to found the Bureau of Zoötechnics with wide limits for the development of its activities, which it began at once to intensify. Later, by reason of the reorganization of the department of agriculture and fomento, the Bureaus of Agriculture and Zoötechnics were consolidated into one Bureau of Agriculture and Livestock but, fortunately, without losing anything that had been gained.

In consideration of the great importance of the livestock industry in Mexico, and realizing the necessity for stimulating it by giving it all possible aid, the government reorganized the present Bureau of Livestock Industry on January 3, 1931. We have been exceedingly fortunate in that our secretaries of agriculture, especially the present secretary, Mr. Francisco Elias, a livestock man of large interests and the present director of livestock, Dr. José Figueroa have demonstrated the most profound interest in the development of that institution. Dr. Figueroa is one of our foremost veterinarians, being an authority on the subject

of bacteriology as well as all phases of the livestock industry. In addition, he is an expert organizer. To him we are indebted in large measure for the present situation of the Bureau of Livestock Industry which, as I have said before, has accomplished great things, considering the elements and conditions with which it has had to contend. In his activities and knowledge he is to us the counterpart of Dr. John R. Mohler, the eminent chief of the Bureau of Animal Industry of the U. S. Department of Agriculture of his country.

In the Bureau of Livestock Industry, veterinarians now find the doors open to a wide field for the development of their activities. The progress made in veterinary medicine was due largely to the fact that those who at different times formed a part of it managed to shake off the lassitude that for so many years weighed heavily upon our profession. This marks a well defined era. Prior to the reopening of the veterinary school in 1916, only 107 graduates had receiveed their degreee. Since 1916, 95 have graduated from the school, showing the great interest that has been created by the activities of the Bureau of Zoötechnics. There is no fear that there will be too great an increase in the number of those who embrace this career. On the contrary, encouragement and guidance are extended to all who are adapted to the practice of the veterinary profession.

The Bureau of Zoötechnics is not the only entity that utilizes the services of veterinarians. Other federal offices, especially the federal department of public health, employs a large number. In addition, the various states have offices that are charged with development of the livestock industry. Besides, there is ample private practice. The army, which previously employed the greatest number of veterinarians, has felt the scarcity of good men. Recently it was found necessary to establish a military school of veterinary medicine in which everything is furnished free to the students throughout the course. When they have completed their study, they are given the rank of major immediately following their graduation.

As the number of veterinarians formerly was small, it was necessary for them to have a broad knowledge of all the different branches of the profession, there having been no opportunity for specialization. Fortunately, we now have well qualified specialists in bacteriology, parasitology, clinical medicine, biochemistry and sanitary police. The latter branch has attained large importance in the practice of preventive medicine and has marked a new trail. Our government has always desired that veterinarians should have the opportunity to specialize. At present some are studying in foreign countries, while others have already done so.

Our profession has given proof of its virility. It has, I believe, been well represented in scientific congresses that have been held in various countries of the world such as England, Germany, France, Spain, Argentina and America. We expect to continue our efforts to maintain and, if possible, improve the high regard with which our profession is held.

Wildlife Conservation

The secretary of the U. S. Department of Agriculture reported at the North American Wildlife Conference, at Saint Louis, that nearly 5,000,000 acres of land for wildlife have been acquired by the government during the past three years. The land is mostly in the submarginal class so far as profitable use for farming, grazing and foresting are concerned. The wildlife conservation land will not only serve the people as recreational areas and a source of game and fish for food, but will also aid materially in combating floods and the manifold evils of soil erosion.

The Cruelest Lies Are Often Told in Silence

A man may have sat for hours and not opened his mouth, and yet have been a disloyal friend or a vile taluminator.

Robert Lewis Stevenson.

New Developments of Interest to the Veterinarian and His Clients in the Storage of Roughage for Animal Feeding*

By A. G. HALL, *New York, N. Y., Borden's Farm Products Division of the Borden Company*

My first experience in trying to save the food value of a crop of green mixed clover and alfalfa dates back to the time when I was about 15 years old. At that time, my father, who had built one of the first silos in our community, and found it valuable for preserving corn stalks as silage, attempted to preserve some mixed clover in that manner. I do not remember much about the labor of putting it into the silo, but I do distinctly recall the labor involved in taking it out. It was a solid mass of decayed, slimy material.

In my farming experience, one of the greatest problems has been the curing and harvesting of alfalfa and clover, especially the first cutting. I have found it almost impossible to cure a crop cut at the proper stage of maturity, due to the rains which are frequent at this time of the year.

CURING PRESENTS PROBLEMS

Time and again, after selecting a suitable field for raising alfalfa, giving special attention to testing the soil for acidity, adding the required amount of lime and harrowing or summer fallowing to kill the weeds, I have been thrilled by the results of this carefully planned program only to find that the feeding value of a splendid crop was practically lost, due to rain while the crop was being cured. The leaves of clover and alfalfa contain about 60 per cent of the protein of the plant. When it is found necessary, due to rain after the crop is partly cured, to shake it out or use a tedder, this valuable part of the plant is usually entirely lost and the digestibility of the stems is somewhat reduced.

About twelve years ago, a few dehydrators or hay dryers were built. I was particularly interested in these and made a special effort to investigate the operation of three different kinds. The disappointing part of this experience was that the expense of operating these dryers was so great that the method was not practical for the average dairyman. Later, Dr. A. I. Vertanin, an agricultural chemical engineer of Finland, found that a mixture of hydrochloric and sulphuric acids, added to green grasses and legumes in silos, preserved them, as these inorganic acids kill the bacteria and prevent putrefaction. This procedure, known as the A.I.V. method, requires considerable technical ability and special equipment, due to the corrosive nature of the acids. While the method was being tried out in this country, reports came from the New Jersey Experiment Station, stating they had been successful in preserving green grasses and legumes in silos by the addition of molasses.

The juices of green cornstalks contain about 4 per cent sugar. This sugar causes a fermentation, which changes the juices to lactic and acetic acids. These acids arrest all development of bacteria and preserve the corn fodder, producing the palatable corn silage which we have been feeding for years. Legumes and grasses contain a much higher percentage of protein and a very much lower percentage of sugar compared to cornstalks. Therefore, usually, when legumes or grasses are put into silos without the addition of a preservative, there is a high bacteria development which causes them to rot or decay rather than ferment.

*Presented at the seventy-fifth annual meeting of the American Veterinary Medical Association, New York, N. Y., July 5-9, 1938.

MOLASSES PROVIDES SUGAR

It was found that by adding 40 to 100 pounds of molasses per ton to green crops, the amount depending on the protein content of the material used, the necessary amount of sugar would be present to cause fermentation and formation of the acids necessary to preserve the fodder (just as the natural sugar in the cornstalks causes fermentation). Experimental work has proven that a large variety of legumes, grasses and green grains, such as alfalfa, soy beans and sudan grass, wheat and vetch, oats and peas, and millet, in fact, any green crop, can be successfully preserved in this manner. Alfalfa is the outstanding leader of this group, because of its high protein and calcium content, as well as its tonnage yield per acre. The others are valued according to their protein content, tonnage yield and adaptability to various soils and climatic conditions.

The most valuable feed is produced when the plants are cut just before the ripening stage, while the nutritive value is in the stalk of the plant and the moisture content is not less than 65 to 70 per cent. It should be put into the silo immediately after cutting. It is generally agreed that the following quantities of molasses should be added to each estimated ton of green material:

	Per Ton
Grasses and cereals.....	40 lbs. (3½ gals.)
Mixed grasses and legumes	60 lbs. (5 gals.)
Alfalfa and clover.....	80 lbs. (7 gals.)
Soy beans	100 lbs. (8½ gals.)

Experimental work has been done by Professor Bender, of the New Jersey Experiment Station, which shows that the more molasses used, the higher the nitrogen-free extract content, so any excess amount is not wasted. Our own experience indicates that plenty of molasses and water added has many advantages. The cost of molasses here in the Northeast is approximately $20.00 per ton retail, which does not make it prohibitive compared to other feeds. In putting in this silage, special care should be given to the packing to avoid air pockets. These are the specific causes of moldy spots and can be eliminated by plenty of tramping and keeping a stream of water flowing on the fodder as it enters the blower. This, of course, is not needed if the grass is wet or juicy at the time of harvest.

PHOSPHORIC ACID METHOD

Another method of preserving legumes and green grass silage has been worked out recently by Professor Wilson, of the New York State Agricultural College. This method consists of adding 16 pounds of commercial phosphoric acid per ton of silage. The action of this acid is similar to that of the A.I.V. method, the silage being preserved with very little fermenation. The advantage is that it is not corrosive in the sense that other acids are. It will not injure anyone or his clothing and, in addition, is easy to use. It does not injure the cutter or blower, as it passes through it, but the machine should be washed off after its use. Another favorable advantage is that phosphorus is added to the soil through the manure. It is estimated that 40 pounds of this silage fed each day, with 16 pounds of phosphoric acid to the ton, will equal one pound of super-phosphate added to the manure. There is some question as to the effect that the small percentage of fluorine, which may be present in the acid, has on the health of the animals. Some long time feeding tests have already been started which will eventually clear up this question. The cost is about the same as molasses.

My first experience with grass silage was with molasses. This was before I had heard of the phosphoric acid method. On my farm at Earlville, N. Y., we first tried to preserve some millet, a little alfalfa, clover and mixed grasses. The results were so satisfactory that the next year we added oats and peas, rye and vetch, wheat and vetch, and soy beans and sudan grass. Last year we filled three silos with the various green crops and, in addition, one stack was built, this being held in place by poles, woven wire and building paper. During the past winter, the cows in our milking-barn each day received one feeding of grass silage, one of corn silage, and one of dry hay, in addition to their grain ration. Late in March, we finished feeding the second

silo of grass ensilage and thought it advisable not to open the third one until later, so we began feeding corn silage twice daily. Within three days, the production from 100 cows had dropped 120 quarts, or three cans of milk. The third grass silo, which was filled with clover, was immediately opened and within a few days the production was back to normal.

GRASS SILAGE MORE VALUABLE

The results of this experience have thoroughly convinced us that grass silage is a more valuable feed, due to its higher protein content, than corn silage. This year we have discontinued the planting of silage corn entirely and will fill all our silos with molasses silage. We have carefully considered the various angles involved in making this change and feel confident that it is by far the better and more economical way of producing the roughage and digestive nutrients necessary to maintain our herd. Under this system, with various crops, our harvest can be spread throughout the season and the major part of the labor can be handled by horses and machinery, eliminating extra labor for haying and silo filling. Land that cannot be used for the growing of corn, due to erosion or excess moisture, can be profitably utilized for the production of these crops.

Feeding tests indicate that milking cows that have been fed as much as 100 pounds of grass silage per day with their regular grain ration, without any other roughage, did not receive the required amount of dry matter to maintain their body weight. It is therefore considered advisable to add at least five pounds of dry hay to their ration. Many heifers, from ten months of age to within two months of freshening, have been reported to have been fed on nothing but green grass silage and have maintained their normal growth. My own experience leads me to believe that it is an excellent feed, but I am still feeding a small amount of grain and dry hay to insure good growth and development of my young stock. It has been reported that grass silage has been fed to advantage to horses, sheep and other animals. This system of utilization of grasses fits well into the program of pasture improvement, of which we hear so much today, as the excess growth of early pasture grass can be cut and put into the silo to be fed later when the pasture becomes short, due to drouths of July and August. This system of farming may change our plans for future farm building; more silos and less hay storage. You, as practicing veterinarians of the dairy sections, can be of great help to your dairymen by making a study of this subject and bringing to their attention the advantages that this system has in lowering their cost of production.

A committee was organized at Cornell during Farmers' Week. A questionnaire was prepared and sent to about 400 farms located in 17 states. The questions and answers were summarized in bulletin form. Both the New York State Agricultural College and the New Jersey Experiment Station have these bulletins. Anyone interested in "Making Hay While It Rains" may easily obtain them.

Dude Ranch for Dogs

The lay press reports the discovery of a dude ranch for dogs near Big Bear Lake, Calif., 100 miles from Los Angeles. Its owners are finding that the pampering of patrician pups is a profitable business. They announce that the summer routine for every canine boarder includes daily sun baths, hiking, squirrel hunts, and trips in a station wagon to the lake, where they enjoy "ducking, retrieving, and water polo." Ultra violet rays and treatments in a beauty shoppe are also catalogued among the doggy luxuries. Furthermore, the resort's literature says "Expectant canine mothers need not sacrifice the pleasures of the Dude Ranch, as there is a well-equipped maternity hospital at their disposal."

Leading a dog's life is becoming more complicated every day.

The only difference between a rut and a grave is in the dimensions.

Carcinoma of the Thyroid with Metastases in Lungs*

By PAUL KLEMPERER *and* LEO MOSCHKOWITZ, *New York, N. Y., Laboratories of the Mount Sinai Hospital and the New York Zoölogical Park*

Malignant tumors of the thyroid gland in animals have been frequently recorded in the literature. Domestic animals were concerned in the majority of the described cases, a fact which may have several explanations. It is quite obvious that domestic animals are more often subjects of medical observations than wild animals. Wegelin,[1-2] in a discussion of the relation between goiter and malignant disease of the thyroid gland in man and in animals, pointed out that where goiter is endemic, malignant tumors of the thyroid occur in greater numbers. Endemic goiter appears in domestic animals as well as in man but, according to Wegelin, not in wild animals. Malignant tumors of the thyroid gland have been observed mostly in dogs and horses, where they developed mainly in goitrous thyroid glands. Wegelin cited a statement of Huguenin to the effect that, in Berne, where endemic goiter of the dog is extremely common, carcinoma of the thyroid very frequently arises in old animals on the basis of a benign goiter. Marine[3] made extensive investigations concerning the occurrence of goiter among street dogs in Cleveland. He found that 90 per cent of all those dogs showed a definite glandular hyperplasia of the thyroid. Sheep were also affected to about the same extent, especially in the region of the Great Lakes. He compared these findings with MacCallum who found that, in Baltimore, a city with a very low incidence of goiter, only 7 per cent of the dogs were affected. Marine,[4] however, did not draw any conclusions from his findings as to the occurrence of carcinoma in dogs with goiter.

An early record of carcinoma of the thyroid can be found in Casper's comprehensive description of neoplasms in animals. He observed malignant tumors of the thyroid in dogs and pointed out as one of their characteristic features, invasion of the lymph and blood vessels, with frequent metastases. Sticker[5] supplied the first extensive statistical data. He reported that among 332 primary carcinomas in horses observed in Germany, eight were found in the thyroid gland. Among 766 primary carcinomas in dogs 32, i. e., 4.1 per cent, occurred in the thyroid. He pointed out the frequent metastatic involvement of the lungs. Woundenberg[6] observed four carcinomas of the thyroid in horses, 14 carcinomas in dogs and one round cell sarcoma in a dog. Ewald[7] collected 75 cases of malignant thyroid tumors in dogs reported by other observers and five cases of his own. Among those 80 cases there were 63 carcinomas, six sarcomas, seven mixed tumors and four unclassified tumors. In his detailed description of the sites of metastases, he also emphasized that the lungs were most frequently involved. Bartlett[8] described two cases of multiple primary malignant tumors in dogs. Both dogs had adenocarcinoma of the thyroid, one with metastases in the lungs, mediastinum and pineal region, and the other with metastases in the lungs only. In addition, the author found in the first dog bilateral primary adrenal mesotheliomata, bilateral congenital multicystic kidneys and a cavernous haemangioma of the liver. In the other dog, the autopsy revealed also a chondro-sarco-endothelioma of the mammary gland and multiple adenomata in the adrenal capsule.

The thyroid tumors were interpreted as sequelae of nutritional deficiencies, which had led primarily to goitrous changes, while the other tumors were considered as expressions of a disturbed embryonal anlage. Goldberg[9] reported one case of a colloid carcinoma in the thyroid gland of a dog, with metastases in the liver, the hepatic

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and omental lymph nodes. In another case of thyroid carcinoma in a dog, he found metastases in the oesophageal lymph nodes, lungs, liver, pancreas and adrenal gland. Mann[10] observed a carcinoma of the thyroid in a dog that had in addition a subchronic gastric and an acute duodenal ulcer. Feldman[11-12] described an adenocarcinoma in a cow, which was situated under the skin over the muscles of the neck, lateral and just posterior to the first cervical vertebra. The histological appearance of this tumor was that of a thyroid carcinoma. The thyroid itself was not examined in this case. In his monograph, "Neoplasms of Domestic Animals," he again emphasized the high incidence of thyroid carcinoma in dogs and

Fig. 1. Coronal section of the markedly enlarged, carcinomatous thyroid.

their frequent metastases to the lungs. Diagnosis of primary carcinoma of the lungs should not be made unless the thyroid gland has been carefully searched for a possible primary involvement.

In regard to its histology, Slye, Holmes and Wells[13] pointed out the widely discussed observation that malignant tumors of the thyroid sometimes exhibit the microscopical appearance of both sarcoma and carcinoma. They found this also to be true as far as malignant tumors of the thyroid in animals were concerned. They found among 51,700 autopsies in mice, only five simple goiters and twelve malignant tumors of the thyroid. Of these, six were simple carcinomas, one seemed to be an angiosarcoma, possibly only invading the thyroid, and three tumors, which in some parts seemed to be carcinoma and in others, spindle cell sarcoma. In addition, they observed an adenocarcinoma of the thyroid in a wild Norway rat that was also afflicted with a hemorrhagic sarcoma of the liver and a primary adenocarcinoma arising in the intra-hepatic bile ducts.

In reference to the histology of these malignant tumors in man, Ewing[14] has expressed serious doubts as to the existence of sarcoma of the thyroid. He is, however, opposed by Wegelin and others. Schlotthauer, McKenny and Caylor[15] examined the thyroid glands of 234 dogs in southern Minnesota. They classified 54 of these as goiter. Among them were 30 colloid goiters, 14 colloid and fetal adenomas, six markedly hyperplastic glands, two cases of old thyroiditis with marked fibrosis and two cases of carcinoma. The incidence of carcinoma was 0.08 per cent for all the thyroids and 3.7 per cent for the goitrous ones. Cameron[16] observed a case of a thyroid tumor in a white mouse. It had the microscopical appearance of almost normal thyroid tissue, but invaded the highly vascu-

larized capsule. There was a metastatic tumor in the right groin, the section of which showed thyroid tissue with definite malignant changes.

An interesting paper is that of Troehler.[17] He advanced the hypothesis that in regard to metastases, carcinoma of the thyroid has a special affinity for thyroid tissue. That, he said, was the reason for the frequent metastatic involvement of the contralateral; in dogs, always a completely separated thyroid lobe. Remarkable also are the frequent

Fig. 2. Showing disseminated nodular metastases.

metastases to embryonal rests of thyroid tissue. He reported 58 cases of thyroid cancer in dogs. In 53 cases there was an involvement of both lobes and in 20 cases, metasteses to aberrant thyroid tissue. Kammer[18] emphasized that in animals carcinoma of the thyroid have not been reported to metastasize to the bones, while these metastases are encountered quite frequently in man.

There are only a small number of reports dealing with the occurrence of malignant tumors of the thyroid gland in wild animals. Fox[19] described an adenocarcinoma sarcomatodes in a "raccoon-like dog" with metastases to the liver and lungs and a mixed tumor of the thyroid in a wolf. The latter was largely sarcomatous, but also contained cartilage. Furthermore, he observed a sarcoma of the thyroid in a coypu (*Myocastor coypus*). Later, in the reports of the Zoölogical Society of Philadelphia, he described a carcinoma of the thyroid in a wolf (*Canis vulpus*), a myxo-chondrosarcoma in a coyote (*Canis mesomelas*) and a carcinoma in a coypu (*Myocastor soypus*). Th. Purnam observed a carcinoma of the thyroid in a *Viverricula malaccensis*, with metastases in the lungs. The matastatic lesions in the lungs exhibited both a "pneumonic" and a nodular type of infiltration. The latter displayed both a solid and an alveolar structure. The alveoli contained a colloid-like substance.

The malignant thyroid neoplasms of fishes, especially the salmonoids, will not be considered in this brief survey of the literature. They have a particular significance, inasmuch as they may disappear after the administration of mercury, arsenic or iodine. It seems doubtful, therefore, that one may regard them as real carcinomas. An exhaustive study of this subject has been made by Gaylord,[20] Marine and Lenhart, Pick[21] and Plehn.[22]

We have had the opportunity of observing a malignant tumor of the thyroid in a gray wolf (*Canis nubilus*). This animal was captured in the Colorado mountains as an adult and was received at the New York Zoölogical Garden in 1929. He was perfectly well until three weeks before he died, when for the first time dyspnea and fever were observed. The dyspnea became progressively worse and in view of his poor condition and a hopeless prognosis, he was killed by the intravenous administration of a large dose of nembutal. At autopsy, he was found to be well nourished. His weight was 34 kg. There was some muco-purulent discharge from the nostrils. No swelling of the neck was noted. The peritoneum was smooth and glistening and there was no excess of fluid. The thyroid gland was found to be markedly enlarged. The left lobe measured 11 x 6.5 x 6 cm and the right lobe 8.5 x 4 x 4 cm. Joining the superior poles of the lobes anterior to the cricoid cartilage was a bridge of firm tissue, 1.0 cm in width. The surrounding muscular tissue and fasia, in places, were firmly adherent to the thyroid.

Coursing along the anterior and lateral aspects of the lobes were dilated veins,

some of which contained firm, reddish-yellow thrombi which were firmly attached to the intima at some points. A few veins above, the thyroid displayed similar changes. On section, the cut surface of the left lobe presented a variegated appearance (figure 1). For the most part the surface was grayish, moderately firm and cellular, mottled with small yellowish foci. There were scattered, irregularly outlined, soft, dark red, hemorrhagic areas. In the central portion were four cysts, varying in diameter from 0.5 to 1.5 cm and filled with a yellowish brown, cheesy material. The right lobe was of a more uniform grayish texture, with a few small yellowish foci distributed throughout its surface. The cut surface of the isthmus-like connection between the upper poles appeared yellowish gray and lobulated. The two thyroid lobes produced a marked degree of lateral compression of the trachea in the region of the cricoid and the first and second tracheal rings. In the anterior portion of the cricoid region of the trachea, just to the right of the midline, the mucosa bulged slightly into the lumen and presented a purplish color. On section, the wall of the trachea was here infiltrated by yellowish-gray tissue continuous with the "isthmus" joining the upper poles anteriorly, as described above. The regional lymphnodes were not enlarged.

On the surfaces of all lobes of the lungs were numerous, scattered, raised, circular, yellowish, firm, discrete nodules, varying in size from 0.3 to 2.5 cm in diameter (figure 2). On section, the nodules had a homogeneous yellow color. They obviously had invaded the lung parenchyma, but were sharply circumscribed. Most of the nodules were encapsulated and could be shelled out easily. The nodules were preponderantly situated beneath the pleura, only a few being present in the deeper portions of the lungs. The remaining portions of the lungs manifested a congested and edematous appearance. The bronchi were filled with a grayish-green, muco-purulent secretion. Examination of the other organs and of various bones disclosed no other metastases.

Sections through the metastatic nodules in the lungs showed them to have the same acinar structure exhibited by the primary tumor. There was frequent necrosis and cholesterol deposits in the nodules. The adjacent lung tissue was edematous and congested. The alveoli contained numerous cells bearing iron pigment. The other organs and the bones showed no remarkable changes.

The heart was of average size. The right ventricle was moderately hypertrophied. The right auricle and ventricle were filled with clotted blood in which were enmeshed four adult filaria (*Dirofilaria immitis*). The pulmonary artery was free of thrombi and disclosed no gross pathological changes.

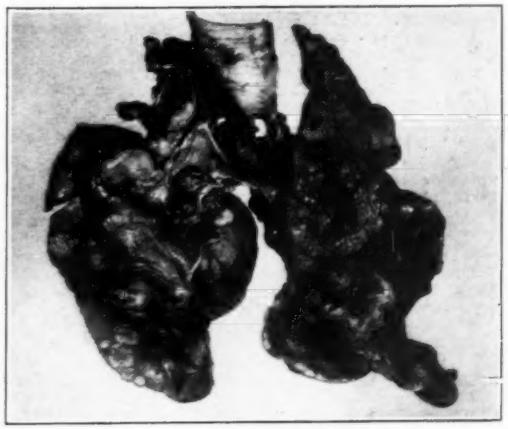

Fig. 3. Tumor invasion of superficial thyroid vein (low power).

The other organs showed no significant changes.

Sections were taken from various portions of the thyroid tumor. Many areas revealed a small acinar structure. The acini only occasionally contained colloid and were lined by cuboidal cells with round, moderately chromatic nuclei. The stroma was very abundant and hyalinized in places, showing hemorrhage and cholesterol deposits. Other areas of the neoplasm revealed a more trabeculated arrangement, the cells being somewhat large, with occasional nuclear atypism. Mitotic figures were very uncommon in both histological types. The adjacent muscle was found to be infiltrated

by a tumor. A large vein was filled by tumor thrombi (figure 3).

SUMMARY

1. A brief survey of the literature is given in regard to the occurrence of malignant tumors of the thyroid gland in mammals.

2. A case of carcinoma of the thyroid with metastases to the lungs in a gray wolf (*Canis nubilus*) is described.

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The Effects of Feeding Grit on Digestibility in Domestic Fowl

The question of the effect of grit on the utilization of different feeds has received little attention. It has been assumed that birds need grit when whole grain or other coarse, hard feed is given and that birds do not need grit when an all-mash diet is fed.

The object of a study, by John C. Fritz, U. S. Bureau of Animal Industry, Washington, D. C., was to determine the effect of grit on the bird's ability to digest its feed.

In the experiments, the necessity for grit was apparent as it was noticed that grinding flint corn before feeding resulted in a higher digestibility of fat. Apparently, grinding of the feed is essential if a high utilization of fat is desired and the bird can do a more satisfactory job of grinding the feed if there is grit in the gizzard. The value of grit was more apparent when field peas were fed. Evidently, there is more need for grit when coarse granular feeds are used.

In the text-book on "Poultry Ailments," by W. P. Blount, the author points out that a hard grit is necessary for a more complete digestion of feed. The opinion was that the lack of grit would allow finely ground feeds to become pasty or doughy in the gizzard. The author referred to the lack of an insoluble grit as an error in management. It was also his opinion that intestinal catarrh may be caused by the continuous use of an all-mash ration without grit.

International Geological Congress

The 18th session of the International Geological Congress will be held in London from July 31 to August 8, 1940.

Observations Incident to an Outbreak of Equine Encephalomyelitis in the Bitterroot Valley of Western Montana*

By HERALD R. COX *and* CORNELIUS B. PHILIP, *U. S. Public Health Service, Hamilton, Mont.* HADLEIGH MARSH *and* J. W. KILPATRICK, *Montana Veterinary Research Laboratory*

In this paper, we present observations on an epizoötic of equine encephalomyelitis that occurred in the Bitterroot valley of western Montana during the late summer of 1936 and on a later epizoötic of unestablished nature among the horses of the same area. The latter, which was similar in most details to the second outbreak of supposed equine encephalomyelitis reported by Madsen[1] in Utah in the fall of 1933, occurred in October about a month after the initial epizoötic had terminated and presented a picture differing in important respects from the earlier epizoötic.

Since there was so marked a difference in the symptomatology, the morbidity and the mortality rates of the two epizoötics, they are treated separately. For lack of a better term, the later one will often be referred to as the "second epizoötic" without intent to identify it etiologically with the first.

OBSERVATIONS ON THE FIRST EPIZOÖTIC

Symptomatology: Similar to the outbreaks reported in California, Utah and Nevada, equine encephalomyelitis first made its appearance in the Bitterroot Valley in the latter part of July, gained maximum momentum during August, and had practically disappeared by the end of the first week in September. The first outbreak was characterized by the clinical symptoms which have been so well described in the literature[1-4] but are briefly restated for purposes of comparison with the subsequent outbreak.

The symptomatology varied greatly, according to the severity of the case. Preceding the onset of more noticeable symptoms, these cases usually showed fever, the temperature varying from 103.5° to 107° F.† Some horses apparently suffered only a subclinical infection, since they never showed evidence of illness other than a temporary elevation in temperature. In others, at least some of the following symptoms were manifest at various stages of illness: a sleepy attitude, crossing of fore legs, extremely foul breath, copious nasal discharge, inability to swallow, a quickened respiration rate, yawning, drooping of one or both lips, marked costal ridges, incoördination of movements, muscular twitchings, especially of the face, lips, neck and shoulder, a backing or sidling gait and grinding of the teeth. An extension of the penis frequently occurred in geldings and stallions. Impairment of vision was sometimes evident.

Many horses became prostrate on the second or third day of the disease and were unable to rise. Of animals thus affected, the only recoveries were among those receiving the best of care. Most of the sick animals died within 24 to 48 hours, or were sacrificed for humane reasons. During the earlier stages of these cases, there were alternate periods of excitement and stupor. Other symptoms were paralysis of the lips, drooling, accelerated pulse and respiration, retention of feces, paralysis of urinary sphincters and blindness. During the periods of excitement the horses struggled violently, made running or paddling motions with the feet, dug deep holes in the earth or wrecked fences. In some cases, death was preceded by several hours of coma.

Epidemiology: The first case was reported on July 25, 1936, and the second on July 28. These two horses were from ranches located on the floor of the Bitterroot Valley about ten miles apart. There had never been contact between these animals. Furthermore, they had not been off

*Contribution from the Rocky Mountain Laboratory, of the National Institute of Health, U. S. Public Health Service, Hamilton, Mont. Received for publication, August 20, 1938.

†The normal temperature is 100° to 100.4° F.

of their respective ranches nor had they been in contact with any animals recently brought into the valley. The first horse died and the second was sacrified *in extremis*. Laboratory recovery of the virus of equine encephalomyelitis (western strain) from each of these cases was accomplished by the senior author.

Within three weeks, the disease had spread so as to include most of the farm area of the Bitterroot Valey. Data for the incidence of the disease in the entire valley and state have been presented by one of the authors[5] but those herein presented concern only the cases which occurred within the territory covered by one of the

Fig. 1. Encephalomyelitis, sleepy type.

authors (J. W. Kilpatrick) as a practicing veterinarian. The area concerned is roughly six miles wide and 30 miles long.

In this area, there were 57 diagnosed cases on 49 ranches having a total of 485 horses. Twenty of the 57 horses died. The morbidity was 11.75 per cent and the mortality 35.09 per cent. Two of the 57 cases were horses vaccinated not longer than three or four days prior to onset, while the remaining 55 were non-vaccinated.

Table I shows the number of cases per week through the period of the epizoötic.

Immunization of Horses: The disease rapidly gained such momentum that it became imperative that measures be taken to check its spread. The Montana Livestock Sanitary Board decided to attempt to immunize the horses by the method recommended by Records and Vawter[6] of the Nevada Agricultural Experiment Station. This method consisted of the simultaneous injection of living virus and

TABLE I—*Incidence per week during the first epizoötic.*

WEEK	DATE	NO. OF CASES REPORTED
1	July 25—Aug. 1	6
2	Aug. 2—Aug. 8	6
3	Aug. 9—Aug. 15	20
4	Aug. 16—Aug. 22	14
5	Aug. 23—Aug. 29	9
6	Aug. 30—Sept. 6	2
	Total	57

specific antiviral serum. The Rocky Mountain laboratory coöperated by supplying the active virus. The antiserum was obtained from commercial laboratories.

The virus suspension was prepared from the brain tissue of guinea pigs sacrified *in extremis*. At first, the two recently isolated Montana strains of virus were employed to immunize a total of 116 horses, 55 receiving the Swanson strain (Number 1) and 61 the Anderson (Number 2). The active virus consisted of a moderately centrifuged (1,500 r.p.m. for 10 minutes) 10 per cent suspension of infected guinea pig brain tissue suspended in a physiological saline solution buffered to pH 7.6. Only fresh material prepared daily was used. Adult horses received a subcutaneous injection of 2 cc on one side of the neck, immediately followed by a subcutaneous injection of 50 cc of antiserum on the other side. For young horses and colts the dosage of both virus and serum was halved.

Later, a Nevada strain of virus (Towle) was substituted. This strain had been successfully employed in the immunization of horses in Nevada by Records and Vawter. For this strain, the dosage was 2 cc of a 2 per cent suspension. Otherwise, the procedure of immunization was the same as described above.

The Nevada strain of virus was used for 853 horses. Two horses receiving this strain showed clinical symptoms of equine encephalomyelitis on the fourth day after injection, whereas none of the 116 horses receiving the Montana strain showed evidence of illness. One of the above horses recovered without residual signs. The sec-

ond horse, however, succumbed with symptoms typical of the disease. It is not known whether or not these two horses contracted the disease from the virus injected, but such a possibility always accompanies the use of active virus preparations.

Treatment: Horses showing clinical symptoms of the disease were treated in much the same manner as recommended by Records and Vawter.[2] Certain affected animals were given repeated subcutaneous injections of antisera, but the number so treated was too small to permit any significant evaluation of this line of treatment.

OBSERVATIONS ON THE SECOND EPIZOÖTIC

Symptomatology: The clinical picture presented in the later epizoötic differed markedly from that which has just been described, and was practically identical in all features with the second 1933 outbreak in Utah considered as equine encephalomyelitis by Madsen.[1] In contradistinction to the cases of proved equine encephalomyelitis observed during the first outbreak, none of the affected horses showed any elevation of temperature and nearly all were at least ten years old or more. The onset was sudden, it not being uncommon for animals to become stricken while at work. The affected animals showed an inability to swallow, lost appetite and refused proffered feed. Further early characteristics were constipation, cessation of peristalsis and yawning. Affected horses rapidly progressed from a state of restlessness into one of extreme violence, usually accompanied by profuse sweating. Some showed an early impairment of vision progressing to total blindness just before death. Practically all had a desire to keep walking forward or in a circle and they attempted to overcome all obstacles by pushing or butting against them with their head and chest. Many chewed dirt, straw or manure (without swallowing) and some violently gnawed wooden posts and trees until the tongue, lips, and gums were badly lacerated. Such horses showed profuse blood-tinged slobbering. Respiratory and cardiac failure rapidly developed. Most affected animals died in less than 36 hours after onset. Practically all horses remained on their feet until shortly before death and did not show the progressive motor paralysis usually observed in the majority of typical equine encephalomyelitis cases.

On autopsy, one of the most noticeable findings was gastro-enteritis. As a rule, the stomach was distended with rather dry food, while the intestinal tract was found to be practically empty. The mucosa of the stomach, particularly of the pyloric portion, was hyperaemic and numerous *Gastrophilus* larvae were present. The remainder of the intestinal tract showed varying degrees of catarrhal inflammation. There was an excessive discharge of mucilaginous material accompanied by hemorrhage and in some cases portions of the intestinal tract were practically denuded of mucosa. The liver showed quite constant changes. The gross appearance of the cut surface showed in some degree the nutmeg appearance of chronic, passive congestion and fibrinous shreds were present on the diaphragmatic surface. The spleen was somewhat edematous and pasty in consistency. The kidneys showed parenchymatous degeneration, with petechial hemorrhages in the cortex. Grossly, the brain and spinal cord appeared normal.

TABLE II—*The morbidity and mortality data of the second outbreak.*

No. of Cases	Total No. Dying	No. of Horses Vaccinated	No. of Deaths		No. of Recoveries	
			Vacc. Group	Non-Vacc. Group	Vacc. Group	Non-Vacc. Group
36	31	32	28	3	4	1

The above symptomatology and gross pathology showed striking similarity to the description of "acute liver atrophy" in equines as discussed by Theiler,[7] particularly in connection with the immunization of horses against South African horse-sickness.

Epidemiology: The first two cases of the second epizoötic occurred October 2 and

7, respectively. Both had been vaccinated against encephalomyelitis. One came from a ranch on which there had been a confirmed case of equine encephalomyelitis during the initial outbreak.

From October 2 to November 16, when the epizoötic terminated, there were 36 cases reported from a total of 27 ranches. Only five of the above ranches had reported cases of encephalomyelitis during the first epizoötic and none of these horses had suffered any recognized clinical attack.

The conspicuous features of the second epizoötic were: (1) the high incidence among older horses, (2) the extremely high case fatality rate, and (3) the majority of cases among animals previously vaccinated against encephalomyelitis.

In table II are data pertaining to the morbidity and mortality rates among the vaccinated and non-vaccinated horses. These show that 31 deaths occurred among 36 cases, a mortality of 86.11 per cent. This is high when compared to the 35.09 per cent mortality for the first epizoötic. Thirty-two of these horses had been vaccinated during the first epizoötic and of this group 28, or 87.5 per cent, died. Three of four non-vaccinated horses died.

Data concerning the age of the animals affected during the second outbreak are shown in table III. Of the 36 horses affected only five were less than ten years old and of these three recovered. One was a four year old, non-vaccinated horse, while the other two were vaccinated horses six and eight years old, respectively. The remaining two horses that survived were both vaccinated animals ten years old.

It is apparent that the disease was much more fatal in horses of the older age group, for of 31 horses ten years old or older, consisting of 29 vaccinated and two non-vaccinated animals, only two vaccinated animals survived. This gave a mortality of 93.5 per cent for this age group as compared to a 40 per cent rate for horses less than ten years old.

Another peculiar feature was that, of the 32 vaccinated animals developing the disease. All had received the Nevada (Towle) strain of virus. None of the 116 horses treated with the recently isolated Montana strains became ill. The morbidity for horses vaccinated with the Nevada strain was 3.75 per cent. If the same rate had prevailed for horses vaccinated with the Montana strain, four animals should have developed the disease.

TABLE III—*Incidence according to age in second epizoötic.*

AGE IN YEARS	NO. OF CASES		NO. OF DEATHS		NO. OF RECOVERIES	
	VACC. GROUP	NON-VACC. GROUP	VACC. GROUP	NON-VACC. GROUP	VACC. GROUP	NON-VACC. GROUP
Under 5	0	1*	0	0	0	1
5–9	3	1	1	1	2†	0
10–14	7	1	5	1	2‡	0
15–20	16	0	16	0	0	0
Over 20	6	1	6	1	0	0

*Four years old.
†One was 6 and the other 8 years old.
‡Both were 10 years old.

LABORATORY STUDIES

FIRST EPIZOÖTIC

Recovery of Virus: As mentioned previously, virus was recovered from both of the first two horses affected. It is of interest to note that it was recovered only from the medulla, although selected portions of the upper cervical cord, pons, cerebellum, thalamus and hippocampus were similarly tested. No further attempts were made to isolate the virus from the central nervous system.

Blood specimens were obtained from four horses in varying stages of the disease, but virus was not recovered, although each sample was injected intraperitoneally, sub-

cutaneously and intracerebrally into guinea pigs, in quadruplicate.

From one horse autopsied immediately after death, the nasal mucosa was saved and guinea pigs were injected in duplicate by various routes (intracerebrally, intramuscularly and subcutaneously) with prepared suspensions. No virus was recovered.

In an attempt to demonstrate virus in the nasal secretions, nasal washings were obtained from eight horses in varying stages of the disease. Each horse was injected high up in both nostrils with approximately 100 cc of Tyrodes solution by means of a glass syringe fitted with a suitable length of thin-walled, flexible rubber tubing.

After collection, the washings were lightly centrifuged. The supernatant fluid was decanted and saved. The sediment, consisting mostly of mucus, was thoroughly ground with the aid of alundum and resuspended in the supernatant fluid. The resuspended material was spun in an angle centrifuge at approximately 3,000 r.p.m. for 20 minutes, after which the supernatant fluid was pipetted off and saved.

Nasal washings prepared in this manner always contained too many bacteria to permit of intracerebral inoculation. Two methods were tried in an attempt to get rid of extraneous organisms. The first consisted of adding merthiolate until a 1:10,000 concentration was obtained and then storing the mixture in cold room for 24 to 48 hours. However, this method was abandoned for, although intracerebrally inoculated guinea pigs showed no immediate ill effects, they invariably died within 24 to 36 hours of a bacterial meninigitis.

The second method was essentially that used by Kramer[8] and his colleagues in the recovery of poliomyelitis virus from the oral and nasal secretions of convalescents. This consisted of shaking the centrifuged nasal washings with 10 per cent ether by volume and storing the mixture overnight in the cold. The following day the ether was removed by vacuum distillation and the ether-free residue tested by combined intracerebral and subcutaneous injection of guinea pigs. Nasal washings prepared in this manner were free of contaminating bacteria, but eight attempts to demonstrate virus ended in failure.

Properties of the Swanson and Anderson Strains: Both of the strains isolated at the beginning of the first outbreak were shown by neutralization tests to be of the western type of encephalomyelitis. However, studies carried out with guinea pigs, by means of which the two recently isolated Montana strains were compared with long established California and Nevada* strains, revealed marked differences. Quite possibly these differences could be explained by the fact that the latter strains had become adapted to the guinea pig by continuous passage over a considerable length of time. However, we believe it worthwhile to call attention to these observations, inasmuch as they differ from the usual experience with established guinea pig strains commonly employed in the laboratory.

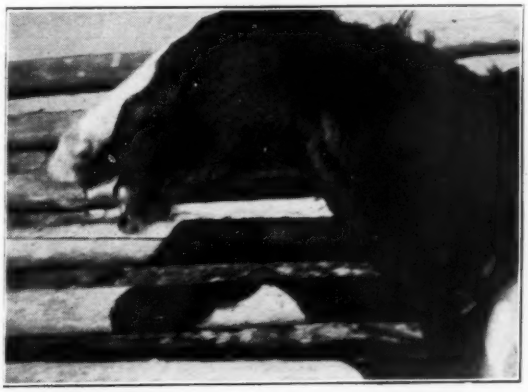

Fig. 2. Encephalomyelitis, pendulous type.

Guinea pigs that received intracerebral injections of either the Nevada or California strains of virus ran characteristic short courses of illness (4 to 5 days). Animals that showed signs of central nervous system involvement invariably died, as a rule within 24 hours of the onset of such symptoms. Animals that were injected intracerebrally and failed to show signs of the disease were never found immune. The brain tissue of guinea pigs succumbing to either of these strains was shown by titration tests to be lethal in dilutions as high as 1:100,000 and in some instances as high as 1:1,000,000.

In contrast to these findings, guinea pigs injected intracerebrally with early passage virus of the two Montana strains showed

*The California virus was sent to the senior author by Miss Beatrice Howitt in February, 1933. The Nevada strain (Towle) was sent us through the courtesy of Dr. Edward Records.

a more prolonged course of the disease and a much lower limit of infectivity.

The Anderson strain appeared to be the more invasive and the more readily adapted to guinea pigs. For the first three passages in guinea pigs, the average time till death was ten to twelve days. As passages were continued the course became shorter, so that by the ninth passage the disease proved fatal on the sixth or seventh day. However, titration tests carried out with brain tissue of both the third and ninth passages proved to be infectious in dilutions no higher than 1:1,000. Study of the strain was discontinued at the end of the ninth passage. It is to be noted that this

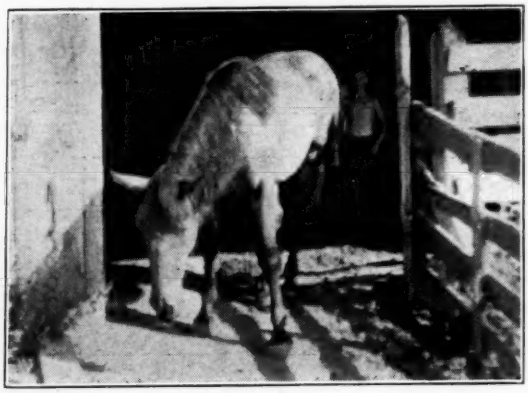

Fig. 3. Encephalomyelitis, showing dirt-eating symptoms.

strain was similar to the Nevada and California strains in that animals showing signs of the disease invariably died, whereas animals that survived an intracerebral injection without showing such symptoms were never immune.

The Swanson strain was similar to the Anderson in its prolonged course in guinea pigs and in its low limit of infectivity. Third, sixth and ninth passage virus in every case was infectious in dilutions no higher than 1:1,000.

However, in its early passages, this strain differed from those above in that it was not always fatal by the intracerebral route. Thus, of 16 guinea pigs injected subdurally with a 1:10 dilution of brain tissue taken during the second, third, fourth and fifth passages, all showed typical symptoms of the disease (emaciation, prostration, salivation and paralysis of the posterior extremities) and of these nine made uneventful recoveries with subsequent complete immunity. This immunity was of such a degree that all of the nine withstood as many as three intracerebral injections of massive doses of the autologous or homologous strains. The other seven were sacrificed for passage of the strain. However, the strain rapidly acquired increased virulence so that only one of four seventh passage guinea pigs survived (with resulting immunity), while all of six tenth passage animals died. This strain was then discontinued.

Second Epizoötic: Material was obtained for laboratory study from five affected horses. Two of these were studied independently by Hadley Marsh and H. R. Cox, while the remaining three were studied jointly.

From one horse the blood, spinal fluid, and urine were tested. The blood, spinal fluid and brain were studied from two others, while from the remaining two the blood, spinal fluid, brain, spinal cord, liver, spleen, kidney, lymph nodes (mesenteric and cervical) and the mucosa from the colon, duodenum and pyloric portion of the stomach, were used.

In each case, suspensions of various segments of the tissues selected were tested for infectivity by animal inoculation. Both unfiltered and Berkefeld N filtrate suspensions were employed. Guinea pigs were injected in duplicate by both the intracerebral and subcutaneous routes.

In those cases in which the suspension was suspected of being heavily contaminated and it was not deemed advisable to filter the material, injections were made subcutaneously with highly centrifuged fractions (5,000 r.p.m. for 1 hour). Animals were also injected with high dilutions (10^{-2}, 10^{-3} and 10^{-4}) of the supernatant fluids in an attempt to eliminate the possibility of neutral mixtures of virus and antiviral bodies in the more concentrated suspensions.

Inoculated animals that showed suspicious symptoms were sacrificed and their tissues transferred to other guinea pigs. As many as six serial passages of selected tissues were made in an effort to demonstrate virus. All these tests gave negative results.

In addition to the attempts to recover a virus, all of the tissue suspensions prepared from the last four horses were tested on

suitable bacteriological media for the presence of pathogenic aerobices and anaerobes. A small gram-negative aerobic streptococcus was recovered from practically all tissues of three of the horses, while a gram-negative clostridium was isolated from a majority of the tissue suspensions from one of these animals and from the fourth horse. However, since neither of these organisms proved to be pathogenic for guinea pigs, white mice or rabbits, they were studied no further.

Histological studies carried out by Hadley Marsh on three of the horses revealed no lesions in the central nervous system. In two of the horses, histological studies were made of the liver and in each there was evidence of damage. One showed degeneration of the cytoplasm of the hepatic cells around the efferent vein with extensive deposits of crystalline hematoidin in the affected cells. There had been some hemorrhage in the areas of degeneration. The arterioles were engorged and there was an inflammatory exudate of monocytes around the portal veins and bile ducts. In the second horse, nearly all liver cells were degenerated, and there was an extensive infiltration of monocytes and lymphoid cells around the portal veins and bile ducts.

DISCUSSION

The etiology of the second epizoötic of 1936 was not determined. While there was clinical evidence of acute cerebral disturbance, the symptoms differed markedly from those observed in the encephalomyelitis outbreak. These facts and the failure to isolate any etiological agent or to demonstrate the presence of lesions in the central nervous system, strongly suggest the non-identity of the two epizoötics.

Although the second epizoötic was probably not directly due to the virus of equine encephalomyelitis, yet the higher incidence of the disease among previously vaccinated horses may not be entirely without significance. As one of us has recently pointed out,[5] it occurred only in those parts of Montana that had been previously affected by the outbreak of encephalomyelitis.

When the disease first appeared (the first cases were in horses that had been treated with serum and virus), it was thought to be caused by a delayed virus reaction. However, this was shown not to be the case when four horses that had never been vaccinated developed the disease. Furthermore, other cases occurred in another part of the state where the horses had received only serum as prophylactic treatment. It was evident too, that the administration of serum was not the direct cause of the disease for, in addition to the four non-treated horses that became ill, it is to be noted that the horses vaccinated with the Montana strains of virus, among which there were no cases, received the same serum as those animals vaccinated with the Nevada strain.

Second epizoötics of undetermined nature occurred in Utah in 1933[1] and in Colorado[9] and Wyoming[10] in 1936. In each of these instances, the disease appeared only in areas previously affected with equine encephalomyelitis. A large number of the horses affected had previously received prophylactic doses of hyperimmune anti-encephalomyelitis serum. However, cases also appeared in horses that had never been vaccinated or received any prophylactic treatment. No virus was recovered.

Fig. 4. Encephalomyelitis, showing cross-legged symptoms.

The symptomatology of the horses affected in the second Montana epizoötic showed a striking similarity to the disease described by Theiler (South Africa) as acute liver atrophy and known locally as "staggers." The disease was first noticed by him in horses that were used in immunization experiments against horse-sickness. Although the disease could not be attributed to any phase of the immunization procedure, yet the fact remained that the greatest number of cases occurred in immunized horses or in animals with a previous history of horse-sickness. Theiler

also noted that an acute hepatitis showing marked similarity to the acute liver atrophy of "staggers" could be induced by the *Senecio* (a plant of the aster family). He was unable to determine the cause of "staggers," but he advanced the theory that the disease is possibly caused by a plant toxin that remains fixed in the liver for a considerable length of time and is made to become apparent by the added action of some disease such as horse-sickness or by immunizing procedures directed against the disease.

The horses concerned in both of the Montana outbreaks were farm animals kept under general farm conditions, often within the confines of a small pasture or barnyard, and up to the present time, we have been unable to incriminate any plant toxin or food poison as being a primary toxic agent.

SUMMARY

Observations are reported concerning an epizoötic of equine encephalomyelitis that occurred in the Bitterroot Valley of western Montana in the summer of 1936. Two strains of virus were recovered and identified as of the western type. Fifty-seven cases were reported from 49 ranches with a total population of 485 horses. The morbidity was 11.75 per cent and the mortality 35.09 per cent. During the outbreak a total of 969 horses were treated simultaneously with active virus-immune serum.

A second epizoötic of undetermined nature, showing a picture differing in important features, occurred about a month after the first had subsided. Thirty-six cases were reported from 27 ranches. Five of these ranches had reported cases during the initial epizoötic. Thirty-two of the 36 horses had been vaccinated against encephalomyelitis and of these 28 died. The disease had a higher incidence and a much greater fatality among the older horses.

All attempts to establish the identity of the etiologica agent of the ater epizoötic resulted in failure.

ADDENDUM

OBSERVATION MADE IN 1937

Epidemiology: Equine encephalomyelitis again appeared in the Bitterroot Valley in 1937. From August 8 to September 13, 29 cases were reported from 25 ranches. Nine horses died. Twenty-four cases were on ranches that had never vaccinated their horses and seven deaths occurred in this group. Four cases occurred on ranches that had vaccinated all horses in 1936, but in each of these new cases the affected animals were non-vaccinated colts foaled in the spring of 1937. Two colts died. The remaining case was a yearling colt that was supposed to have been vaccinated in 1936. However, this ranch owned a large number of horses (127) and there is the possibility that this colt missed being vaccinated. This animal showed typical symptoms of the disease for a day or two and then made a rapid and complete recovery.

Isolation of Virus: Only one attempt was made to isolate a strain of virus and in this we were again successful in recovering the virus from the medulla of a sacrificed animal. This strain was of the western type.

Treatment: Due to the fact that one of the conspicuous features of the second epizoötic of 1936 was that a majority of the cases were animals previously vaccinated against encephalomyelitis, it was decided not to use any method of immunization in 1937. Affected animals were treated only by being retired from work, placed in isolation and given the best care possible.

Not a single horse developed any later symptoms similar to those described as occuring during the second epizoötic of 1936.

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Dr. Alexis Carrel, staff member of the Rockefeller Institute for Medical Research, New York, on April 26, was awarded the honorary degree of Doctor of Science by Manhattan College, New York, on the occasion of its 75th anniversary.

A Simple and Practical Test for the Diagnosis of Equine Osteomalacia*

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Equine osteomalacia is quite prevalent among horses in the Philippines, particularly among racing ponies. The early detection of incipient cases is essential in order that preventive measures may be instituted, thus protecting horse breeders and owners from financial loss. At present, the diagnosis of incipient cases is difficult. Diagnosis at best is only presumptive in mild or moderate cases where pathognomonic symptoms are absent. The object of this paper is to present a very simple and practical test for diagnosis.

MATERIALS AND METHODS

Last April, when the senior author went to Tokyo to visit scientific institutions, he

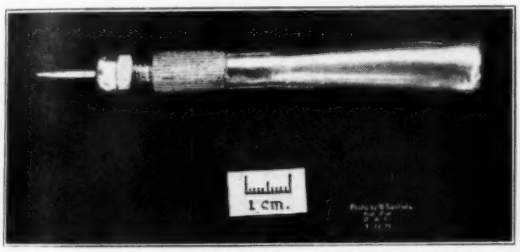

Fig. 1. Dr. Izuka's stylet ready for use.

met Dr. Akio Iizuka, of the veterinary laboratory, Ministry of Agriculture and Forestry. Dr. Iizuka has done and is doing a great deal of research work on equine osteomalacia. Through his kindness, the senior author had an opportunity to visit his well-equipped laboratory. While there, he was given a very simple instrument which we think is of practical value in the diagnosis of this disease.

This instrument consists of a pointed stylet measuring 2 mm in diameter and 3.5 cm in length, attached with a nut to a handle that is similar in appearance to an ordinary trochar, as shown in figure 1. To use this instrument, the head of the horse is held by the halter and the stylet, which is allowed to protrude 1.5 cm from the handle, is inserted with a steady and moderate pressure into the frontal sinus. The proper point for insertion is near the middle of an imaginary line connecting the inner canthi of the eyes. A positive test is indicated by the ease with which the stylet can be inserted into the bone, as shown in figure 2. In negative cases, the insertion cannot be made. Besides, the animal shows evidence of pain not found in positive cases. Sometimes a negative test may be obtained on the right side of the median line but not on the left.

At the time of writing, we have performed this test on a total of 112 horses; 55 males and 57 females, ranging in age from 1⅓ years to 18 years. We now use this instrument in our college clinics as a routine method of diagnosing incipient and positive cases of osteomalacia.

As shown in table 1, of 112 horses examined, 48 positive cases were found, 22

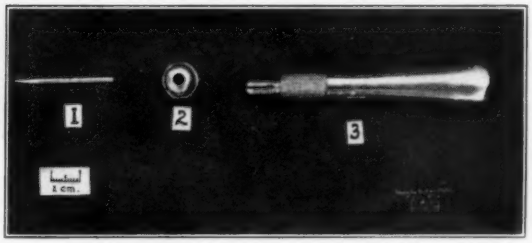

Fig. 2. Dr. Izuka's stylet showing construction.

of which showed swelling of the facial bones, thickening of the ramus of the mandible, chronic stumbling and obscure lameness. Some animals showed but one of these symptoms, others two or more. The other positive cases showed no apparent symptoms. Of the 64 negative cases, four showed lameness, one a thickening of the ramus of the mandible and a slight swelling of the facial bones. The other negative cases showed no symptoms related to osteomalacia.

*Read in the Congress of the Philippine Veterinary Medical Association held in Manila on February 17-18, 1938. Received for publication, March 26, 1938.

With regard to the 22 positive cases showing no apparent symptoms, we believe that they were in the initial stage of the disease, because a majority of them later developed typical symptoms of osteomalacia. On the other hand, the single case which

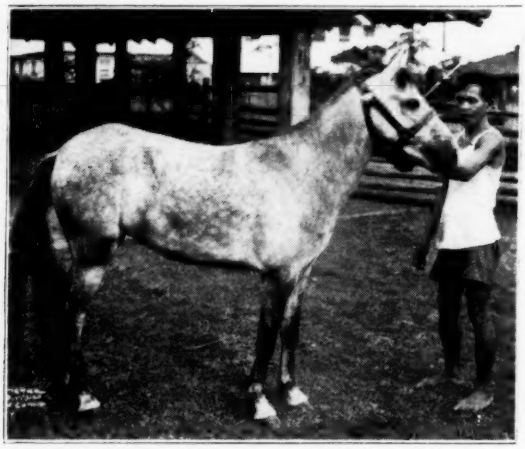

Fig. 3. No clinical symptoms, but positive test.

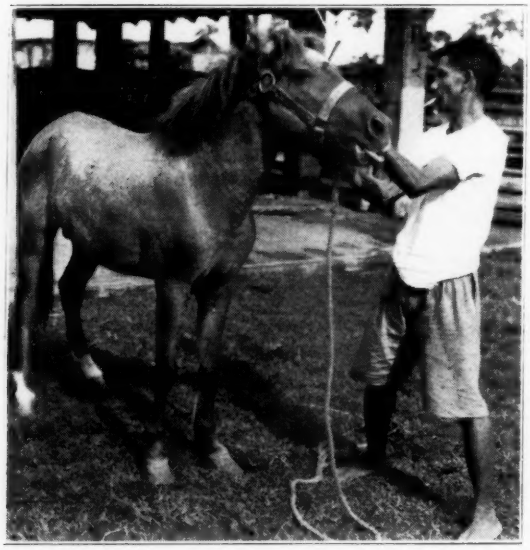

Fig. 4. Stylet in place in positive case.

was negative, notwithstanding the presence of swelling of the ramus and maxillary sinuses, is one in which we believe that the disease had been arrested or cured. This opinion is confirmed by osteomalacia cases that have been cured with the calcium carbonate treatment. When retested by the new method, they gave negative reactions.

Case 1: Female, dark bay, 6 years old, 46 inches high. Slight swelling of facial bones and slight thickening of mandible. On May 12, 1938, she gave a positive reaction. On May 13, 1938, she was given 50 cc of polysan subcutaneously and, once daily, 1 tablespoonful of calcium carbonate with the feed. On May 17, 1938, another dose of polysan was given. On June 22, 1938, she gave a negative reaction when tested. On June 23, 1938, she was placed on the pasture and the administration of calcium carbonate was stopped. On August 20, 1938, the animal was still negative. On August 21, 1938, 50 cc of polysan was given intravenously.

As noted in the above protocol, we have introduced, in addition to the usual treatment, the use of polysan or colloidal magnesium hydrate. This drug is administered at the rate of 50 to 100 cc of a 1 per cent solution, either subcutaneously or intravenously, in conjunction with daily administration of 1 tablespoonful of calcium carbonate, mixed with the feed. The additional injection of polysan seems to hasten recovery, as magnesium is known to help the absorption and retention of calcium in the bones. Further studies on the adjuvant action of magnesium hydrate in conjunction with the administration of calcium carbonate are in progress.

DISCUSSION

The bulging of the maxillary sinuses and the rounding of the superior border of the mandible lateral to the molar teeth are the pathognomonic symptoms upon which a conclusive diagnosis of equine osteomalacia is now made. In incipient cases showing intermittent or shifting lameness only, particularly when accompanied by exostoses or other pathological conditions, diagnosis is difficult. Kintner and Holt[1] used x-ray examination of the metacarpal bones for this purpose and claimed that this method affords an accurate means of diagnosing osteomalacia. This method, however, is expensive. The chemical examination of the blood of osteomalacia horses cannot be depended upon for a conclusive diagnosis, since the changes in the serum calcium and inorganic phosphorus are not constant throughout the course of the disease.

The simple and inexpensive test herein described and introduced by Dr. Iizuka in the diagnosis of equine osteomalacia affords us a very practical method of detecting, with a relatively high degree of accuracy,

the early stages of this disease. The test is based upon the observation that the bones of the skull, particularly the frontal bones, are the parts of the skeleton that are affected first. Sumulong, after careful study of the bones of incipient, mild, moderate and severe cases of equine osteomalacia, found that rarefication of bones occurred in the following order: (1) skull (2) vertebrae and ribs (3) flat bones of the extremities such as the scapula and os coxae and (4) long bones of the extremities.

This test, which is harmless and easily performed, can be periodically applied to all the horses in a stable in order to pick out those animals which may need calcium treatment and thus arrest further progress of the disease. It can also be used to determine whether or not a cure has been attained.

CONCLUSION

A simple and practical test, as an aid in the clinical diagnosis and prevention of equine osteomalacia is described.

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A New Method for Marking Small Laboratory Animals

Frank A. Beach, Jr., American Museum of Natural History reports, in the May 6th issue of *Science*, that he has found an extremely simple and practical method of marking small animals, especially rats used for experimental purposes. He uses a tattooing machine designed for use on human beings and tattoos the identification numbers in the ears. Such a tattooing machine can be purchased in any large city for $3.00 to $4.00 in an establishment where tattooing is performed. Dr. Beach reports that young rats can be marked for life at time of weaning. In addition to laboratory technicians, possibly some of our small animal practitioners can find a use for this idea.

The "Saturation" Method for the Treatment of Breeding Failures with Wheat-Germ Oil*

By AUGUST J. PACINI, *Minneapolis, Minn.*

Vogt-Moller,[1] Bay,[2] Andersen,[3] Tutt[4] and Jones and Ewalt[5] have reported successful results in the treatment of breeding failures in dairy cows.

Cows selected for the test were apparently free from any anatomical or pathological disorder. Presumably, the breeding defect was due to faulty nutrition and since the usual standard dairy rations were used, the nutritive defect was assumed to be vitamin-E deficiency, since all the other nutrients were thought to be adequately represented in the ration. In these tests, about 70 per cent of the cows responded favorably to wheat-germ oil treatment, whether given by injection or by ingestion.

Some of the experimenters injected intramuscularly 10 cc of wheat-germ oil. Intramuscular injections were later replaced by subcutaneous administration of wheat-germ oil to avoid disagreeable results. Others have fed wheat-germ oil, which is preferable to wheat germ and invariably superior to sources of vitamin E represented by green feed. Shute[6] has recently concluded that green feeds, such as lettuce and water cress, are not capable of replacing wheat-germ oil in the treatment of pregnancy disorders in the human and this corresponds with the experience that green feeds, such as alfalfa and pasturage, are not so effective as wheat-germ oil in the correction of breeding disorders.

Although some cows responded favorably to a single injection of 10 cc of wheat-germ oil, others required two injections spaced one estrous period apart, and still others required three injections. About 30 per cent of the cows treated with wheat-germ oil failed to respond to one, two or three injections, 70 per cent being restored to fertility. This would seem to indicate either that there is another element in nutrition responsible for breeding failure, or that the degree of vitamin-E depletion in these cows was much greater than is represented by one ounce of wheat-germ oil.

As a result the experiments reported from the above, observers suggest that the cows may be temporarily sterile in consequence of inadequate vitamin E. Assuming that vitamine E and wheat-germ oil are synonymous (and for which assumption there is not sufficient reason), there are no experiments available to demonstrate that the ration of the cow can be completely depleted of vitamin E and that infertility results therefrom. In other words, there is no experimental evidence to prove conclusively that the cow requires vitamin E in her feed in order to breed. It is surmised that she requires vitamin E largely because of the work of the experimenters cited above and because other mammals are known also indispensably to require vitamin E for reproduction. An exception seems to be the goat, according to work done in Iowa, where several successive generations of goats were reared on a presumably vitamine-E-free diet.[7] These experiments imply that the goat is capable of synthesizing its own vitamin-E requirements, much as the dog is capable of synthesizing its vitamin-C requirements.

Grain and green feed are often considered abundantly adequate sources of vitamin E. It is now felt that green feeds do not replace wheat-germ oil. Although green feeds contain a liberal amount of vitamin E, as determined by an assay on the white rat, their inability to replace wheat-germ oil satisfactorily suggests that wheat-germ oil may owe much of its value to ingredients other than vitamin E. This concept is reënforced by many experiments indicating the complex nature of wheat-germ oil, much as cod-liver oil was formerly used almost as synonymous with vitamin A

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until vitamin D was discovered to be present also. To be uniformly effective, it seems desirable that the wheat-germ oil be recovered from wheat germ by pressure and not through the use of solvents. Some solvents apparently react with the oil in a fashion to create substances which produce cancerous growths when fed to animals[8] experimentally. Other solvents appear to catalyze the destruction of vitamin E.

Some evidence begins to accumulate which points to the undesirability of solvent-extracted oils because the solvent removes materials from the impure admixture which is present in commercial wheat germ used to make wheat-germ oil. These admixtures seem to neutralize and to offset the effect of the wheat-germ oil. Thus, whereas no harmful or ill results have ever been reported from cold-pressed wheat-germ oil, many doubtful reactions, some of them leading to severe harm, may result from the use of solvent-extracted wheat-germ oil; and because of this doubt, the use of solvent-extracted oil has been deprecated and virtually completely displaced by the use of cold-pressed oil. It is true that solvent-extracted oil costs about one-half as much to prepare as do cold-pressed oils, because the solvent removes practically all of the oil from the germ, whereas cold pressure removes only about half. This saving is not economical, however, since the results in the use of the two oils may be vastly different.

It is always difficult to determine precisely the degree of the lack of vitamin E in any given farm animal. Obviously, a cow showing only a small vitamin deficiency will require only a small amount of wheat-germ oil; and, conversely, cows showing a great deficiency will require larger amounts of wheat-germ oil. That such variations in requirements exist in practice is revealed by the findings of Vogt-Moller and others, who used one, two or three injections of 10 cc each. It is also conceivable that conditions may exist in which the vitamin-E intake which would be normal for a healthy cow is destroyed more rapidly in a cow showing breeding troubles. Largely to offset these hazards in the use of wheat-germ oil, the method of "saturation" has been employed with considerable effectiveness.

The saturation method has for its premise the intent of saturating the animal with the physiological amount of vitamin E to insure breeding success from this source. Repeated experiments have shown, on numerous animals of various species, that over-doses of vitamin E are totally without harmful effects. Under-doses of vitamin E may lead to failure in results.

To treat by the saturation method, the animal is fed at one single dose four ounces of wheat-germ oil. This is followed by a tablespoonful of wheat-germ oil every third day for a time equivalent to one estrous cycle, or 21 days, or seven tablespoonfuls of wheat-germ oil. Thereafter, the animal is furnished grain feed to which four ounces of wheat-germ oil has been added to each ton of grain feed.

The innovation introduced by the saturation method of treatment consists in furnishing a liberal amount of wheat-germ oil all in one dose at the very beginning of the treatment. Such a comparatively large dose seems to compensate for the variation in the degree of vitamin-E depletion that different cows may present; for the degree of richness or poorness of vitamin-E content in the ration of the cow; and for minor variations in the possible changing potency of unstabilized wheat-germ oil. Rarely, a 4 ounce dose of wheat germ oil may occasion a slight laxative effect, which is entirely ignored. Careful observers will note that in from two to three weeks after the initial 4 ounce dose is fed to the animal, a symptom which suggests that the cow will react to the wheat-germ oil treatment is a perceptible improvement in the condition of the coat of the animal. As a rule, animals whose coats fail to display an improved condition, generally always fail to respond favorably in the correction of their breeding disorder.

As far as experience now furnishes available evidence, the saturation method is effective in about 85 per cent of the cases in place of the 70 per cent reported by the

use of the previous methods of treatment.

The saturation method has been used effectively with bulls, cows, stallions, mares, boars, sows, rams and ewes. Notwithstanding the reports from the University of Iowa, that goats do not require vitamin E, milk goats showing breeding disorders bred promptly following the use of cold-pressed wheat-germ oil. These experiments are being repeated under more careful control.

It is quite probable that wheat-germ oil contains an anti-abortive factor, which is distinct from the reproductive vitamin E; and it is further probable that associated with the anti-abortive factor and the reproductive vitamin E, there occurs also in wheat-germ oil another factor which seemingly counteracts or prevents the toxemia of pregnancy. Shute has furnished some evidence for this in his work with the human, and the effectiveness of wheat-germ oil in combating "big liver" disease in poultry, may in all likelihood be associated with this new factor. Toxemias of pregnancy of the eclamptic type show pathology in the liver. Big liver disease is not a filtrable virus leukosis, but rather the erythroleucotic type of leukosis, which, distinguished from the myelotic and lymphatic, has never yet been produced by a filtrable virus.

A fourth factor, which may be present in wheat-germ oil and upon which some work is now in progress to attempt isolation, exerts a galactogogue action. This factor, if it is a separate entity, is exceedingly labile. Until now, it has never been found in a solvent-extracted wheat-germ oil, although its presence is frequently suspected in a cold-presed wheat-germ oil.

Owing to the undoubted complexity of wheat-germ oil, it would seem desirable to lessen the emphasis on vitamin E and to recognize that the therapeutic use of wheat-germ oil cannot be considered synonymous with vitamin-E therapy. Unfortunately, the terms wheat-germ oil and vitamin E have been used interchangeably by many experimenters and authors, where more properly the term wheat-germ oil only was justified.

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Bang's Disease

According to report received from United States Department of Agriculture, in the 45 months since the coöperative work to control Bang's disease was begun, State and Federal veterinarians have tested an average of more than half a million cattle each month. Since July 1, 1934, a total of 23,715,375 blood tests have been completed. Of this number, 1,471,990, or 6 per cent, have been positive, signifying the presence of the disease. The work is being conducted in the 48 states and in Puerto Rico.

Anthrax Control

Methods used and results obtained in northwestern states is ably presented by Harry J. Boyts, Live Stock Commissioner, in a mimeographed copy received at the JOURNAL office on August 27, 1938. The summary of his article is as follows:

1. State authorities emphasize the control of the use of anthrax spore or virus vaccines and the administration of such vaccines by qualified veterinarians.

2. Vaccination of live stock on infected farms and neighboring farms in April or May each year is necessary to protect live stock from anthrax.

3. Prompt quarantine of live stock upon positive laboratory diagnosis of anthrax is necessary.

4. Thorough burning of all dead carcasses must be practiced.

5. Anthrax is a dangerous disease as anthrax spores live in the soil for many years, and its control is of major importance to the live stock industry of the Northwest.

Some Ways to Detect and Prevent the Spread of Trichomoniasis in Cattle*

By C. H. CASE *and* W. O. KEEFER, *Akron, Ohio*

Due to the great loss from trichomoniasis suffered by some of our clients (one farm estimating a $10,000 loss last year), we have been trying to find a reliable method of detecting trichomonads in recently purchased bulls, whether proven or not, and especially if they are aged before they are used in herds where they might transmit the disease.

First of all, a recently purchased bull should be bred to two or three virgin heifers. Swabs from the vagina should be taken from each of these heifers twelve to 20 days after they are bred, and if trichomonads are found in any of them, the bulls should not be used on any herd. Swabbing the sheath of the bull is another method for detecting trichomonads, but if they are not found on one swab, it is not a final indication that the bull is not infected.

We find that the best way to swab the vagina of the calf and the sheath of the bull is to use a small pledget of cotton moistened with normal salt solution, using a 20 inch Knowle's forceps. After rotating the swab a few times in the sheath or vagina, we place it in a 2 dram vial, such as we use for collecting blood samples for the Bang test, and barely cover it with more normal salt solution. The swab is thus conveniently kept for subsequent testing in the laboratory.

Many times it is very difficult to find trichomonads in cows that abort, even though the history and symptoms are positive for trichomoniasis. If the amniotic or other placental fluids are available, a sample of these may be examined. Because it is the unexpected that always happens, very few owners are present at the time of the abortion. However, when trichomonads are suspected, you can have the owner bring the aborted fetus to the hospital so it can be examined. We have made more positive diagnoses by examining a sample of the mucus from around the base of the tongue of the aborted fetus than in any other way.

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In all cases, a small amount of mucus is collected in a vial as aseptically as possible and diluted with a few cubic centimeters of physiological salt solution. Many of these samples show no trichomonads for a day or two, but if they are kept at room temperature, trichomonads will undoubtedly appear on the third or fourth day, if they are present. If they are seen on the first examination, they become much more numerous a day or two later. After that, bacterial decomposition usually sets in and the trichomonads disappear.

Fig. 1. Trichomona infection. Lower left is a normal bovine kidney.

On one occasion, an owner brought a 7 month fetus in a grain sack a day after it was aborted. The skin was very dry and dirty. There was only a small amount of moisture between the toes. The mouth, however, contained a relatively large amount of clear, clean mucus, which was examined and found to contain many trichomonads. We had previously examined the stomach contents with negative results.

Because it is so simple, some of our clients, living at some distance from our hospital, now collect samples in this manner and send them to us by mail. We prefer this method of handling, for we can properly diagnose trichomoniasis in a higher percentage of cases than we were ever able to do before by any other procedure.

Further information on this subject may be obtained from Dr. M. A. Emmerson, University of Pennsylvania, Philadelphia, Penn.

The Tring Zoological Museum

The veterinary profession, always interested in scientific events, will be interested to learn that Lord Northfield has bequeathed his $2,500,000 zoölogical museum to the British Museum, according to a news item appearing in the May 6th issue of *Science*. The Tring Zoölogical Museum, so-called because it is situated on the outskirts of Tring, close to Tring Park, was begun in 1889, with a cottage in which Lord Northfield housed his insect collection. The bequest covers an area of some three acres upon which stands a main building, forming three sides of a square, and a large annex, containing the zoölogical collection, a library of 30,000 volumes and many original paintings of mammals and birds. The exhibition galleries, which include some 2,000 mammal specimens, are open to the public, while the research section, in which are housed some 1,400 specimens is, as a rule, available to students only. No doubt many veterinarians planning to attend the International Veterinary Congress this year will desire to arrange to spend some time in this museum of unusual scientific interest.

Adulterated Butter

Alertness of Food and Drug Administration inspectors has led to the seizure of more than 90 tons of adulterated butter in Chicago during the last few days, according to information received from the United States Department of Agriculture.

W. A. Hagan Honored

At the seventy-fifth commencement of Kansas State College, held May 30, 1938, the degree of Doctor of Science was conferred on Dr. W. A. Hagan, Dean of the New York State Veterinary College, Cornell University. The citation was made by Dr. Julius T. Willard, college historian, who said, in part, "Dr. Hagan's ability has been the basis for his steady promotions and the imposition of constantly increasing responsibilities. He is a prolific writer and an active member of professional organizations. His appointment as dean of the New York Veterinary College at Cornell marked him as one of the most distinguished of the graduates in veterinary medicine from Kansas State College."—*The Cornell Veterinarian.*

D. H. Udall Honored

At the annual commencement of the University of Vermont, June 13, 1938, the degree of Doctor of Science was conferred on Dr. D. H. Udall, professor of veterinary medicine at New York State Veterinary College, Cornell University. In presenting Dr. Udall for the degree, Professor Frederick Tupper, Head of the Department of English, at the University of Vermont, in his citation said in part, "Dennie Hammond Udall, graduate of this University, leaving shortly before commencement to serve as private in the Spanish-American conflict, major in France in the World War, professor of veterinary medicine at Cornell and recently awarded the Twelfth International Veterinary Congress prize for 'the most outstanding work of the year,' author of many books and articles in his own domain, a scholar and man of action richly meriting the approbation of his academic mother."—*The Cornell Veterinarian.*

To see what is right and not do it is want of courage.—*Confucious Analects.*

Pyelonephritis in Cattle*

By C. C. PALMER, *University of Delaware, Newark, Del.*

In Europe, pyelonephritis is regarded as a very frequent disease of cattle. In this country, the few investigators who have reported the disease all believe it is of considerable economic importance. Boyd[1] has reported upon the disease in Minnesota and is of the opinion that it is a fairly common disease of cows. Bemis[2] described one case in detail and states that pyelonephritis seems to be quite common in cows and the condition seems to be identical with the condition discussed under this heading in Hutya and Marek.[3] Jones and Little,[4-5] reported their observations upon 20 cases and in 1930 reported the results of their studies upon the epidemiology of the disease. They are of the opinion that the disease may be of considerable economic importance; that many cases originate as infections during early life, involving the lower genito-urinary tract of calves, and by a gradual ascending, the infection may finally reach the upper urethra and bladder. They believe that the disease is independent of genital diseases; that natural infection does not take place by way of the blood stream, as the disease cannot be produced by intravenous inoculations; that transmission by contact occurs, as when the same individual curries both normal and infected cows and that the bull does not often act to disseminate the disease during copulation.

The writer,[6] in 1931, reported the disease, describing several cases in detail. Three of the herds, in which the infection has been found, have been kept under close observation with a view to collecting data upon the epidemiology of the disease. As several years have now elapsed since the first cases in these herds came to our attention, it is now possible to draw conclusions relative to the natural infection within these herds. The disease, within these herds, has spread very slowly and, therefore, it has not been of great economic importance. As it is the practice to conduct autopsies upon all animals which die or are destroyed in these herds, it is believed that few, if any, cases of pyelonephritis have escaped our attention.

Under conditions of natural infection, specific infectious cystitis and pyelonephritis has spread very slowly in the herds under observation. While symptoms of the disease may appear suddenly, of an acute nature, the course of the infection is usually chronic, months or possibly years being required for the pathological changes to develop to the point of producing clinical symptoms. Several of our cases have been found during the course of routine examinations for pregnancy in apparently normal animals. Several months elapsed before the animal showed clinical symptoms of the disease. The chronic nature of the pathological changes and the frequent absence of clinical symptoms until the disease is well advanced is well shown in the following case.

The patient was a purebred Holstein-Friesian, three and one-half years old. She gave birth to her first calf at the age of 2½ years. It was a normal birth. During her first lactation period, she had a good appetite and her milk production was normal. During this first lactation period, her caretakers regarded her as slightly unthrifty, but in view of the good appetite and milk secretion, she was not presented for medical examination, except once, when she appeared to be suffering from a digestive disturbance. She made a rapid recovery from this attack. It was noted at this time, however, that she was not carrying quite as much flesh as other cows in the herd of the same age. She was bred in June, examined and pronounced pregnant in October and gave birth to her second calf in March. Her second lactation period started well but, in June, during a very hot spell of weather, she was observed to have a poor appetite and ap-

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peared dull. When examined, her expression was bright. She moved about the large box stall in which she was confined with ease. She was in a fair state of flesh but not fat. In general appearance, she did not appear to be seriously sick, but to the trained eye of her caretaker she appeared dull. While taking her temperature, micturition occurred and a few clots of blood were observed in the urine. The temperature, heart and respirations were normal. Rectal palpation revealed a sensitive bladder and greatly enlarged kidneys and ureters. Based upon these findings, a diagnosis of cystitis and pyelonephritis was made and slaughter recommended. In many of these cases, symptoms of cystitis, indicated by frequent micturition with the urine sometimes stained with blood, are the first to appear. When the caretaker was asked if such symptoms had been noted in this case, he stated that blood had not been observed. He, however, observed urination at frequent intervals, especially during milking, but little significance was attached to this, as some cows seem to have the habit of urinating several times while being milked.

The pathological changes observed at autopsy were confined to urinary organs. The entire muscosa of the bladder showed marked congestion. The bladder wall was normal in thickness. Both kidneys were increased greatly in size and were filled with pus. The right kidney was considerably larger than the left. Owing to their size and being distended with pus, it was a difficult task to remove the kidneys from the abdominal cavity. The right kidney ruptured during removal and much of the pus that it contained escaped. Its weight, therefore, was not accurately determined but was estimated to be about twice that of the left kidney, which was 3,670 grams. The accompanying table records the measurements of the left and right kidneys from this case compared with measurements of normal ox kidneys as recorded by Sisson.[1]

The ureters were greatly enlarged. The right ureter was several times the size of the left. The normal ureter has a diameter of ⅛ to ¼ inch. The right ureter, in this case, had a diameter of 1 inch or more throughout most of its length. The ureters were surrounded with a thick layer of loose connective tissue filled with a gelatinous infiltration. Much of this material was removed in preparing the specimen for photographing. Cultures made from the kidney pus gave the gram-positive diphtheroid which is regarded as the specific etiological agent in this disease, also *Eberthella pyogenes*, a pus-producing microorganism frequently associated with genital diseases of cows.

TABLE I—*Kidney measurements.*

	Pathological Kidneys	Normal Kidneys	
	Left	Right	Average
Length	15.5 inches	16.5 inches	8–9 inches
Width	8.5 inches	9.5 inches	4–5 inches
Thickness	3.5 inches	12–15 inches	2.5–3 inches
Weight	3670 grams	Not determined	600–700 grams

SUMMARY

A study has been made of the spread of specific infectious cystiitis and pyelonephritis under conditions of natural infection in several large herds of dairy cattle. The disease has spread very slowly in all of the herds and it has not been of great economic importance.

In the majority of the cases studied, the course of this disease has extended over a long period of time. Clinical symptoms do not become pronounced until the pathological changes are well advanced. After the onset of acute clinical symptoms, the course of the disease is usually rapid.

One case, regarded as being fairly typical

of the syndrome presented in this disease, has been described in detail. Typical of the great majority of these cases, the pathological changes in this animal developed very slowly and were responsible, probably, for the slight degree of unthriftiness observed in the cow during her first lactation and which culminated in acute symptoms of the disease more than one year later.

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The Soybean

Twenty-seven states are now growing soybeans. Forty-one million bushels were raised in the United States during the year 1937, of which Illinois contributed 21,918,000 according to reports. Future increases are to be expected.

Soybeans mature in 100 days from planting and yield from 14 to 28 bushels per acre. Yields as high as 40 bushels per acre have been obtained. The average Illinois yield is 19½ bushels. Soybeans are relatively impervious to draught, dampness and cinch bugs. Like other legumes, soybeans add nitrogen to the soil. The meal makes a very fine cattle food, as anyone who attended the Nutrition Conference of Veterinarians, held at Decatur, Illinois, on August 5, will testify. The full value of soybeans has been recognized in the orient since 2,838 B. C.

A Southern lady once observed to me that gaiety is one of the surest marks of the aristocrat; and it is one of the unwritten laws of French politeness that a long face is a breach of manners.—Richard Le Gallienne.

Cattaloes

Cattaloes are crossbred animals, a result of breeding bison and domestic cattle. Belonging to the genus *Bos*, the bison and cattle are interfertile. Bison bulls are bred to domestic cows to produce the first cross, a hybrid or half-breed bison. Male calves are seldom born alive, owing either to the hump of the shoulders, which prevents their passing through the cow's pelvis, or to too great a quantity of allantoic fluid. However, those which do survive are sterile. Some of the females are fertile. The second cross is made by using a domestic bull on the hybrid. The females resulting from this cross are mated to bison bulls and the offspring are termed cattaloes. Besides more rapid growth and greater vigor, the cattaloes are attributed to have greater resistance to diseases, including blackleg and Texas fever. They have lower feed requirements and a greater ability to withstand lack of water and are not apt to run from heel flies or drift in storms. Cattaloes also produce a higher percentage of dressed meat.

New Meat Cut Table

Meat may be selected by the housewife according to its food value as well as its cost through the use of a new table which shows the approximate average composition of the different cuts from three classes of lamb carcasses. The table, which has just been issued by the United States Department of Agriculture, is one result of a series of meat investigations that have been in progress for twelve years.

The Lamb Crop

This year's lamb crop is reported by the Bureau of Animal Industry as being about 5 per cent larger than the 1937 lamb crop.

Gravity is only the bark of wisdom's tree, but it preserves it.—*Confucious Analects.*

The Practitioners' Summary of Current Opinion on Bang's Disease*

By A. N. CARROLL, *Pueblo, Colo.*

Nationally and internationally, Bang's disease is the great scourge of the cattle industry. Therefore a sane, practical method of control, a plan harmonious to both livestock owners and the veterinary profession, is a challenge that merits our best efforts.

Dr. Louis Merryman, U. S. Bureau of Animal Industry, estimates that Bang's disease reduces milk production 22 per cent, cuts calving efficiency and the calf crop 40 per cent and that, because one out of five aborting cows becomes sterile, the resultant loss from breeding troubles, sterility and mastitis increases the replacement rate by 30 per cent. Herds free from Bang's disease calve every eleven and one-half months while the calving rate in infected herds is 20 months.

Unfortunately, during the first years of organized control, both serological diagnostic tests and commercial vaccines gave such variable results that much damage and confusion was the inevitable result. Today, however, both diagnostic tests and vaccines have been vastly improved. Agglutination tests, both tube and rapid types have, with the possible exception of suspicious cases, proved very reliable. Conversely vaccination, especially of calves, with standardized vaccines prepared from the federal bureau Strain 19, of Cotton and Buck, is proving very effective.

COÖPERATIVE TESTS

For a number of years, the United States Bureau of Animal Industry, in conjunction with the various states, has carried on a blood-testing program. During the fiscal year ending in June, 1937, some 8,000,000 head were tested, with 5 per cent reactors. This number represented about 15 per cent of the total cattle population of the United States. In addition, under federal supervision, some 5,000 calves were given live culture vaccine in 285 herds representing 20,000 breeding cattle.

Regulatory authorities have had difficulty in popularizing their program due to many drawbacks, not the least of which has been the reluctance of owners of valuable cattle to enter into agreements whereby they might have to sacrifice valuable breeding stock. These drawbacks and difficulties have been well summarized by DeFosset, U. S. Bureau of Animal Industry, Columbus, Ohio, who states that: "The major problem is the one relating to persistent infection in certain herds, even after several tests and the removal of reactors." As further contributory factors to the aforementioned difficulty he lists:

> Lack of coöperation and indifference on the part of owners regarding sanitation, maternity stalls, lack of cleanliness and lax disinfection; lack of interest in the blood test, except when abortions actually occur; difficulty in convincing owners that cows with normal calves may be aborters; keeping reactors on the place too long, 30 days or more; failure to list all eligible cattle; making replacements from untested herds and not properly segregating these new additions; too many suspects, which later may become positive, that have not been separated from the herd; abortions in negative herds; the failure of aborting cows to react; a reaction in cows that have never aborted or given any breeding trouble; abortions not caused by Bang's disease; failure of veterinarians to properly advise owners; interference with blood reactions due to the use of vaccines; the sale of abortion cures; difficulty of retesting at proper intervals; difficulty of assembling cattle in range districts; unscrupulous dealers; removal of cattle from auction markets back to farms; smuggling cattle across county lines; lack of state legislation; and unofficial informative testing.

VACCINATION

In view of these many detrimental factors and some apparently insurmountable obstacles to widespread blood testing, it is heartening to note that the extensive ex-

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periments of the federal bureau in calfhood vaccination are still decidedly encouraging and that these experiments are to continue. For example, in a series of bureau experiments involving 115 vaccinated calves together with controls, about 89 per cent of the former resisted the disease as compared to 27 per cent of the controls. In yet another instance, eight out of ten animals vaccinated during calfhood completely resisted *B. abortus* infection of a severity that caused all the ten unvaccinated controls to become infected and to subsequently abort with positive bacteriological findings in the uteri.

These same 20 cows were again bred. The vaccinated heifers produced eleven vigorous calves. Two head that had produced weak calves at their first calving were passing *B. abortus* from the uterus and udders. The remaining eight were free. The ten controls gave birth to 8 vigorous calves at the second calving together with two weak calves. The uteri of three and the udders of eight were infected.

In another experiment involving 14 head of vaccinated calves and nine controls, 86 per cent of the former resisted subsequent infection while only 33 per cent of the latter withstood later exposure.

AREA WORK

While blood testing of individual herds has witnessed many or all of the drawbacks previously noted, area work has, on the other hand, produced very satisfactory results. This is notably true in Virginia where the percentage of reactors, under area testing, dropped from 9.7 per cent in 1934 to 1.5 per cent in 1936, thus prompting Dr. Givens, Virginia State Veterinarian, to remark that: "We in Virginia feel that this method is the solution of the Bang's disease problem." However, the question is raised as to whether or not other states, with a higher incidence of infection or with variant range conditions can hope to do as well.

Dr. C. R. Donham, Ohio State University, says: "Doubtful reactors are the greatest drawback in control by blood-testing." He further lists the three main contributing causes as:

> Recently infected animals later becoming positive; animals yielding a decreasing titre which may become negative in time; which type of cows is held to be valuable by many breeders, as they are believed not to be dangerous, but possesses an immunity to further infection, and the presence of native, natural or non-specific agglutinating substances in the blood of non-infected cattle which is too high at times and which may thereby discredit the test.

Donham further states that: "The agglutination test is an invaluable aid in diagnosis but should not be the sole evidence upon which a diagnosis is based. There are many other things peculiar to each herd necessary to form the proper procedure in diagnosis and the veterinarian in the field is much more capable of accurately diagnosing the condition than the laboratory alone." This observer places the average incubation period of the disease at ten to twelve weeks with a minimum of two weeks and a maximum of several months, thus making the time or date of the test very important. Donham also cites the difference in susceptibility and states that it is very rare for an entire herd to become infected at once. In this disease the baby calves, in marked contrast to tuberculosis, are non-susceptible. As the calf reaches maturity the susceptibility curve jumps and reaches the peak at full breeding age. Then, as the cow grows older, this susceptibility curve declines and many cows doubtless become immune later in life.

In 1936, Fitch, Boyd and Bishop, University of Minnesota, reported the results of an extensive experiment on the problem of suspicious reactions to the agglutination test. From these studies they concluded that it is possible to arrive at a reasonably accurate diagnosis and logical disposition of suspicious reactors, but that no definite rule governing this is possible. Diagnosis and disposition of reactors is influenced by a series of tests over a period of time, by the stage and duration of pregnancy and by adequate herd history. Also, their research indicated that most animals carrying a constant suspicious titre are not dangerous and

do not spread Bang's disease in an otherwise clean herd.

NATURAL IMMUNITY

Creation of natural immunity in calves by natural infection is not satisfactory according to the experimental work of Birch and Gilman, New York State Veterinary College. "Over a period of ten weeks, six calves were fed milk known to be free of agglutinins that contained cultures of *B. abortus*." All calves reacted and the titre eventually subsided. These heifers were then bred and later exposed by conjunctival inoculations. Five showed a marked rise in agglutinins; two gave birth to small weak calves before 270 days and five proved to be spreaders.

SUCCESS REPORTED

Many practitioners concur in the opinion of Dr. S. L. Stewart, Olathe, Kan., that, in view of the fact that Bang's disease is an economic problem rather than one primarily involving public health, the slaughtering of infected animals, especially those of high production value, is not justified.

This observer further contends that in his experience, vaccination backed by common sense herd handling measures, has been approximately 95 per cent successful. A 100 per cent calf crop has followed single vaccination of open cows and heifers, removal of sterile animals and revaccination of aborters two or three times during the pregnancy period following an abortion. Under this method abortions have dropped to 4 per cent over a four-year period.

This statement is at variance with the 1937 report of the A. V. M. A. Committee on Bang's Disease for, in their opinion, vaccination possesses no curative value and that use of vaccine on mature animals is inadvisable. They do, however, conclude that immunization of calves four to eight months of age with cultures of low virulence offers some encouragement and promises more success than any vaccination method employed to date.

HEIFERS VACCINATED

Dr. L. J. Tompkins, Sheffield Farms, cites an interesting experiment involving 66 head of virgin heifers vaccinated with strain 19. These heifers were in a herd repeatedly blood tested under federal supervision backed by all accepted practices for control of the disease. In this herd only three head of the vaccinated heifers aborted either at the first or second calving while none has shown a titre of more than a partial 1:50 reaction.

Tompkins observes that a high titre develops shortly after vaccination but that this titre usually recedes at 1:50 or below in about 150 days. The dosage of vaccine used ranged from 5 cc for a 200 pound calf up to 10 cc for a 500 pound calf. When this dosage was employed the reaction titre receded somewhat more quickly than where Cotton's recommendation of a 5 cc dose for a 300 pound calf plus 1 cc additional for each 100 pound of bodyweight was followed. In contrast to the aforementioned results in the vaccinated heifers, two control groups showed an abortion or high titre incidence of 23 per cent prior to calving.

Further studies in the Sheffield Farms experiment were made to determine the presence or absence of infection in these vaccinated heifers after freshening. Cultures of milk samples from each quarter, checked by guinea pig inoculations, were consistently negative. Tompkins concludes his article with the statement which seems, in the opinion of the writer, to be the crux of the entire situation: "The results thus far obtained are very satisfactory to us. The vaccine seems *to take off the edge of susceptibility* and acts as good insurance when properly handled."

A MIXED HERD

Dr. C. M. Haring, University of California, cites informative studies bearing on the results of vaccination in a California state institution herd. This herd consisted of 21 positive and 22 negative cows, 19 heifers and eight calves, both of the latter groups being negative. Thirteen of the cows were shedding *B. abortus* in their milk during 1933. As some of these shedders were valuable, a number were kept in the herd and an attempt made to reduce the disease by systematic vaccination of calves and open heif-

ers without removing the infected cows until such time as they become unprofitable producers.

Over a period of four years, 93 head of heifers were vaccinated and this measure apparently resulted in retardation of the spread of infection. The association of vaccinated cattle with healthy non-vaccinated cattle did not result in any spread of strain 19 type infection (vaccine strain) to the latter. No apparent injury resulted from vaccination of three heifers between the third and fifth month of gestation.

Three years later, seven of the original 13 shedders were still in the herd and all were discharging *B. abortus*. In 1937, the herd consisted of 65 cows, 49 of which had been vaccinated as cows or heifers. Only ten cows in the herd have a titre of 1:100 or above and nine of these are young vaccinated cows. Haring observed that vaccination of lactating cows resulted in a sharp reduction of milk flow for an approximate two weeks period.

ANOTHER EXPERIMENT

Yet another experiment on vaccination is cited in herds on the Olympic Peninsula of the state of Washington. There it was deemed impractical to follow an elimination plan because of constant and unpreventable mingling of cattle. Hence it has been planned to control the disease by vaccination of calves and heifers in both positive and negative herds. To date there has been no apparent damage to negative herds following this procedure.

In the Olympic project all herds were tested under state supervision and, while positive animals were not permitted to be moved from one herd to another, they were allowed to mix freely with both positive, negative and vaccinated animals on the home premises. Some of these herds had over 50 per cent reactors on the first blood test with calf crop losses upward of 100 per cent. Over 200 of the vaccinated heifers have calved within the past six months with but three abortions. In view of these results it is hoped to work out plans whereby owners suffer a minimum financial loss and whereby full coöperation with both federal and state bureaus will be possible.

A PROBLEM

Hardenbergh, of the Walker-Gordon Farms, believes that whether or not eradication of Bang's disease is feasible or profitable remains to be proved even though results obtained under the federal program of the past few years are duly considered. It is his opinion that this plan, together with elimination of reacting cattle, is admirably adapted to many herds and can, with sufficient care, be made to produce excellent and lasting benefits. At the same time it is also his opinion that the program is not adaptable to other herds with the same promise of practical economic success that has characterized tuberculosis eradication.

Hardenbergh has stated: "The building of large cattle populations highly susceptible to *B. abortus* infection is an epidemiological hazard, the fierce consequences of which cannot at present be evaluated. It would seem logical to investigate to the limit every possibility of immunization against Bang's disease before committing ourselves to an elimination program that might have serious backfiring potentialities." In this review I have attempted to bring to your attention the divergent and even conflicting opinion of authorities better qualified than I am. Many expressed opinions coincide with my own observations.

This material has been presented to stimulate discussion and to guide future plans and policies for handling the disease in practice. While I cannot subscribe to the present mass control plan of testing and elimination in its entirety, I do believe that it is a very good start toward accomplishing permanent benefits. It seems to me that this program should be supplemented by calfhood vaccination as soon as possible and that immunization should be an accepted and integral part of the control plan. In my own mind there is no question but that future control of Bang's disease will comprise use of both blood testing and vaccination because the latter method has continually shown promising and practical results. Are we not, therefore, losing valuable time

both from an economic and disease control standpoint by failure to coördinate these two plans of control?

SUGGESTIONS

I would suggest that regulations preclude the positive cow from free movement between herds but permit her to remain on the home premises if the owner so desires. I would also permit the properly vaccinated calf from a positive or negative herd to be transported in the same manner as a negative animal. I would so modify existing regulations that each herd would be allowed to work out its own salvation with the selective choice of a number of flexible control plans each suitable to its own peculiar problem; plans stringent enough to afford community protection, yet not severe enough to work economic hardship upon owners.

Somewhere there is a middle ground or happy medium in the control of Bang's disease. Let us accept known facts and work out a practical program.

Bang's Disease

The United States Department of Agriculture, in its news releases for information of the press, states that no drug or combination of drugs has yet been found effective in the treatment of Bang's disease. Further statement is made that although no drug or medicinal compound has proved to be effective, steady progress is being made by systematic testing of herds, the removal and slaughter of diseased animals and maintenance of proper sanitary conditions.

AAA Announces 75 Counties Subject to Dairy Amendment

A list of 75 widely distributed counties in which commercial dairying has been increased sufficiently to be affected by the terms of the so-called Boileau amendment to the 1938 Farm Act was announced by the Agricultural Adjustment Administration on August 20.

Cattle News

Barring the recurrence of droughts the trend of cattle production in the United States is likely to be upward during the next few years, according to the Bureau of Agricultural Economics.

Grain and Hay Supplies

The United States Department of Agriculture advises that large supplies of the major feed grains and of hay are in prospect for the 1938-39 feeding season.

Anthrax in California

Dr. H. Bergh, county livestock inspector, reports that ten cows and 15 sheep, in the neighborhood of Benicia, Calif., have been affected with anthrax. Fifteen-year-old John McCarthy contracted the disease following the burning of the carcass of one of his father's two cows which had died of the malady. Young John was sent to the Letterman Military Hospital in San Francisco in a critical condition. At last reports he was improving and may recover.

Dairy Sires Ear-Tagged

From the United States Department of Agriculture comes the information that a total of 320,000 identification records and 110,000 production records of individual cows have been collected by state dairy-extension agencies and filed with the Bureau of Dairy Industry. This data is being collected in order to prove the work of dairy sires.

Cattle on Feed, August 1, 1938

The number of cattle on feed for market in the Corn Belt States on August 1 was reported by the Bureau of Agricultural Economics to be about 12 per cent larger than on August 1 last year.

Blood Chemistry in The Study of Nutritional Diseases of Swine*

By D. F. EVELETH *and* H. E. BIESTER,† *Veterinary Research Institute, Iowa State College, Ames, Iowa*

Unthriftiness and failure to grow are conditions frequently found in pigs raised on dry lots. Various reasons are given for the cause of these disturbances. Chronic diseases and parasitoses are most often blamed for unthriftiness when swine are kept confined under these conditions. Improper nutrition is more often the limiting factor in failure to obtain normal animals. Possible nutritional deficiencies in dry lot feeding may be protein, vitamins, calcium, phosphorus, magnesium, chlorine, iodine, iron and, what is more probable, certain constituents found only in green feeds or properly cured hay.

The pathological lesions resulting from nutritional diseases are often of a general type and frequently do not suggest even the nature of the etiological agent. A description of the pathology encountered in certain experimentally produced nutritional disturbances in swine has been made by Biester and Eveletth.[1] It is the purpose of this report to attempt to show the presence and absence of certain dietary deficiencies as determined by chemical analyses of the blood.

EXPERIMENTAL

The experimental pigs with their dams were placed on the various rations shortly after birth. The rations were fed *ad libitum* twice daily and self waterers were used so that an adequate supply of feed and water was always available. The animals were kept in large, dry lots with all vegetation kept removed. Shade was provided during the hot weather. The sows were removed from the pens when the pigs were about ten weeks old. Weekly weights were taken of the individual pigs and at the same time certain individuals were injected with ascorbic acid. Pigs were killed from time to time for blood analyses and tissue studies.

TABLE I—*Experimental rations.*

RATION I		RATION II		RATION III		RATION IV	
	%		%		%		%
Yellow corn	98.0	Yellow corn	96.0	Yellow corn	93.0	Yellow corn	48.0
*NaCl	0.5	*NaCl	0.5	*NaCl	0.5	*NaCl	0.5
$CaCO_3$	1.5	$CaCO_3$	1.5	$CaCO_3$	1.5	$CaCO_3$	1.5
		Skim milk pwd.	2.0	Skim milk pwd.	5.0	Skim milk pwd.	50.0

*Iodized 0.52 gm KI per lb. NaCl.

All animals were fasted over night before taking blood for analyses. The samples were obtained by sticking the stunned animals and collecting the blood in flasks containing 3 mg sodium citrate as an anticoagulant per cc of blood. For serum analyses separate blood samples were taken.

The analytical methods used are listed by reference number in the following tables. The composition of the rations used is calculated in the previous report.[1] The experimental rations are given in table I.

The first three rations are low in calcium, phosphorus and protein. They all

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†The authors are indebted to Mr. T. W. Millen for technical assistance during the course of these studies.

contain adequate amounts of iodine, chlorine, magnesium, sodium, potassium, vitamins A, B complex and E. The pigs had access to sunshine during all of the experiment which gave ample vitamin D. Most of the growing period was during the summer.

Protein was low in the first three rations but high in ration IV. It is doubtful if any appreciable amount of vitamin C was present in any of the rations. Iron was not considered an important factor since these animals had large open pens for exercise. It was observed that the pigs in all groups rooted up considerable soil which may have furnished some iron.

A summary of the growth rates is given in table II. These data show very clearly the failure of the animals in groups I and II to grow. Pigs in group III grew slowly for about three months and then some began to lose weight. The large individual differences in the initial weights of group IV are due in part to the use of animals from two litters of pigs. These animals grew well for most of the experimental period.

Pig 773 died of some obscure condition. Neither the pathology nor the blood chemistry was suggestive of the etiology. In certain respects the pathology of the muscle was similar to that described by Pappenheimer[2] for guinea pigs and rabbits fed a ration treated with ferric chloride and ether to destroy vitamin C.

Pig 761 ceased growing about August 7, 1938. A progressive loss of weight followed. When killed on September 18, 1938, a very extensive intestinal adenomatosis was found.

TABLE II—*Rate of growth of pigs on different rations.*

PIG	GROUP	6-2-36	7-2-36	INITIAL WEIGHT			FINAL WEIGHT	DAYS ON EXPERIMENT
				8-7-36	9-11-36	10-16-36		
775	I	28	43	50	50	51	49	159
788	I	27	45	50	48	47	46	171
766	I	28	48	56	56		53	123
789	I	28	43	43	40	40	40	171
776	I	29	48	57	59	55	55	159
6107	I	20	27	27	25	26	26	147
777	II	16	32	43	49	50	50	154
850	II	13	27	35	35	38	148*	278
851	II	12	24	30	31	28	147*	278
767	II	15	29	38	36	40	40	118
778	II	14	27	36	37	41	40	154
779	III	25	39	51	57	68	70	154
773	III	24	40	53	52	45	†	151
853	III	26	44	53	53	58	86	278
852	III	23	43	60	64	60	110	278
780	III	21	37	46	47	50	52	154
768	III	16	28	33	34		35	118
781	IV	13	32	63	112	160	161	154
854	IV	26	57	98	132	195	294	278
782	IV	15	41	76	107	192	206	154
761	IV	17	42	80	77		71‡	116
769	IV	24	42	79	112		135	118
849	IV	20	45	87	118	192	315	278

*On ration IV from 10-16-36 to 3-2-37.
†Died of unknown cause.
‡Intestinal adenoma.

RESULTS

The results of the chemical studies as they apply to this investigation are given in the following tables.

Vitamin C. These rations are extremely low in vitamin C. Hughes, Lienhart and Aubel[3] concluded that swine did not need an exogenous source of vitamin C. The data in table III are from some of the experimental pigs with other animals used as controls. The extreme variations and limited number of analyses preclude the use of statistical analyses. However, it is suggested that the injected pigs have a tendency to a higher plasma ascorbic acid than do sows on pasture or the experimental non-injected animals. The cholera immune pig kept inside for a long period had a decidedly low plasma ascorbic acid. These analyses of the blood when taken into consideration with the absence of symptoms or lesions of scurvy suggest very strongly that swine have the ability to synthesize vitamin C. The very low value encountered in the pig hyperimmunized for cholera cannot be explained at present.

TABLE III—*The ascorbic acid content of swine plasma* (4).

PIG	GROUP	ASCORBIC ACID INJECTION	MG %
H	Hyperimmune for cholera	—	0.26
6151	Normal dry feed	—	0.60
6152	Normal dry feed	—	0.69
A-Sow	Pasture	—	1.01
B-Sow	Pasture	—	0.75
C-Sow	Pasture	—	0.59
D-Sow	Pasture	—	0.75
775	I	+*	0.69
776	I	—	0.77
777	II	+*	1.03
778	II	—	0.77
779	III	+*	0.86
780	III	—	0.86
781	IV	+*	0.86
782	IV	—	0.60

*Injected pigs had received 1 gm. each of ascorbic acid 3 days previous to the analyses.

The data on the serum proteins seem significant in the light of the wide range in the protein available in the feed. It is of interest to note that on rations I and II the pigs grew for a time and then became extremely emaciated. In no case was edema noticed notwithstanding the low serum protein. The possible use of serum protein determinations in the diagnosis of the cause of unthriftiness in pigs is suggested by these findings. The data shown in table IV give the values of the serum protein as determined in the various groups.

The progressive decline in serum proteins in group I is clearly illustrated. When pigs 775 and 776 were killed after 159 days on the experimental ration they had serum protein values of 6.3 and 5.7 per cent. Pigs 788 and 789 after 171 days on the same ration had serum protein of 5.3 and 4.3 per cent. The same trend is noticed in the first three groups and pig 854 in group IV. Ration IV appears to contain sufficient protein. At 154 days, pigs 781 and 782 had serum protein values of 8.0 and 7.1 per cent and at 278 days, pig 849 had a value of 5.7 per cent. This animal was not normal as he had lost weight as judged by general appearance. Pig 854 killed at 278 days had a serum protein value of 8.5 per cent. The malnutrition of pig 849 gives evidence of the lack of some dietary factor in ration IV which manifests itself in changes in the blood which were not correlated with the dietary intake. Pigs 850 and 851 failed to produce normal serum proteins when changed from ration II to ration IV for a period of 137 days.

Wide ranges of calcium and magnesium were available in these four rations. Ration I was the lowest in calcium and magnesium which is reflected in the serum calcium and magnesium. The effects of other deficiencies may have manifested themselves in the concentration of these constituents in the blood of these animals. Fatty degeneration of the liver is frequently associated with low serum calcium. The relationship of these two conditions has not been established. Studies on the metabolism of magnesium give inconsistent results which frequently cannot be interpreted. In these nutritional studies there is evidence of a low serum calcium in most of these pigs. Hughes[11] found about 53 per cent of 258 pigs of all ages to have a serum calcium between 11 and 12 mg per cent. In all of these rations the calcium to phosphorus ratio approximated 2 to 1.

Further experiments are necessary to interpret both the serum calcium and magnesium relationship to the pathology induced by dietary regimen. The plasma calcium and magnesium data are given in table IV.

The inorganic phosphorus of the plasma or serum is given in table IV. It is impossible to absolutely compare these data since plasma inorganic phosphate is lower than serum inorganic phosphate. The trend of the blood phosphate of the pigs is shown well in these experiments. Pig 766, group I, when killed at 123 days had a nearly normal plasma inorganic phosphate. A definite gradation is shown in pigs 767, 768 and 769, killed at the same time. The probable reason for the low phosphates in group II as compared to group I is the smaller size of the animals in group II at the beginning of the experiment (See table II). Pigs 850 and 851 transferred from group II to group IV have a higher serum inorganic phosphate than others on ration II. Pig 761 showed severe intestinal adenomatosis. The low value for pig 849 is not associated with the dietary phosphorus but with some other form of malnutrition. These data would indicate that all of these rations except IV were suboptimal in phosphorus content.

In table IV are given the hematocrit and whole blood chlorides. The cell volumes for animals in the first three groups are definitely low. Normal values were found in group IV for all except pig 761 in which the intestinal adenomatosis was found. Pigs 850 and 851 transferred from group II to group IV had normal hematocrit values. The chlorides in all groups were variable. Neither the pathology of the kidneys nor the serum proteins appeared to be correlated with the whole blood chlorides. Group IV received considerable more chlorine than any of the other groups.

TABLE IV—*Chemical analyses of the blood of the experimental pigs.*

PIG	GROUP	DAYS	SERUM PROTEIN (5) PER CENT	PLASMA CA (6) MG PER CENT	PLASMA MG (7) MG PER CENT	PLASMA (8) INORGANIC P MG PER CENT	WHOLE BLOOD CHLORIDES (9) MG PER CENT	HEMATOCRIT (10)
775	I	159	6.3	10.3	3.1	5.5	275.	32.7
788	I	171	5.3	8.9	2.5	7.5	195.	33.9
766	I	123		10.1	2.6	7.2	295.	43.6
789	I	171	4.3	9.5	2.4	6.5	274.	31.1
776	I	159	5.7	10.0	3.6	6.4	273.	32.9
777	II	154	5.8	11.6	3.3	5.1	268.	34.7
850	II	278	6.3	11.7	3.2	7.5 (s)	250.	46.4
851	II	278	6.2	11.1	3.1	7.2 (s)	252.	51.0
767	II	118		10.0	2.4	5.6	289.	38.2
778	II	154	6.1	11.5	2.9	5.0	274.	34.0
779	III	157	6.6	11.0	3.1	7.2	281.	37.2
773	III	151	4.2	9.9	3.3	7.3 (s)		
853	III	278	4.9	9.6	3.4	7.1 (s)	264.	38.1
852	III	278	5.8	10.2	3.0	6.7 (s)	248.	44.8
780	III	154	6.7	12.9	3.7	6.8	264.	33.9
768	III	118		10.6	2.8	6.2	284.	44.2
781	IV	154	8.0	11.5	3.9	9.2	277.	42.2
854	IV	278	8.5	11.3	3.8	8.7 (s)	247.	44.3
782	IV	154	7.1	10.9	3.5	8.4	263.	43.0
761	IV	116		10.1	3.6	14.9	280.	27.0
769	IV	118		10.1	2.4	8.7	270.	50.5
849	IV	278	5.7	11.1	3.2	6.2 (s)	262.	48.0

(s) Serum used instead of plasma.

DISCUSSION

Nutritional disturbances in swine may be characterized by changes in the histopathology and the blood chemistry which

are of progressive nature. These changes may be of such nature that without very complete knowledge of the ration and history of the animals the abnormalities would be meaningless. The data given in this and the previous report[1] are useful in evaluating blood and tissue changes which are the direct result of malnutrition. In these experiments rations based on corn and skim milk powder in varying amounts have been used and the effect on growing pigs determined. Many seemingly unimportant factors may have played major roles in the production of pathological changes in the tissues and the blood. Failure to grow normally on the first three rations might easily be ascribed to low protein in the rations. The tendency to lower calcium, phosphorus and cell volume may be due to inability of the animals to use the available calcium, phosphorus and iron or to a deficiency in these minerals. Serum protein was for the most part well correlated with the protein in the ration, animal 849 being an exception. This pig grew well but after about eight months he developed a very rough hair coat, lost weight and walked with a stilted gait. Low serum phosphorus and serum proteins were found. This is probably an example of a dietary deficiency with symptoms developing only after a long period. Ration IV fed this animal was considered to be entirely adequate. Pig 854 killed at the same time was normal as far as the blood chemistry was concerned but ovarian and myelin sheath degenerations were present and some difficulty in locomotion was observed.

Blood chemical studies have been found useful in connection with physical observations and histopathology. The data which have been obtained aid in the study of some of the infectious as well as nutritional diseases. The role of calcium in the prevention of fatty degeneration of the liver is not known. In these experiments low serum calcium is found associated with liver and kidney lesions. The relationship of one blood constituent to another is suggested by low calcium and low protein in the same serum.

The time relationship to pathologic manifestations is clearly shown in the serum proteins. Samples taken for analyses from all animals on August 14, 1936, showed no differences between the groups and all were in the normal range. This is in decided contrast to the later data.

Individual variation in response to dietary deficiency is high in swine. Some animals will show symptoms of deficiencies, while others will not. Another factor illustrated in these experiments is the effect of the size of the animals at the beginning of the experiment. Small pigs cannot withstand nutritional deficiencies as well as larger animals.

An interesting observation in the very low serum protein pigs was the absence of edema. Many species develop nutritional edema when the serum protein falls to a critical level.

In these studies animals have been fed rations similar to those frequently encountered under practical animal husbandry conditions. Both blood chemistry and histopathology have demonstrated abnormalities which are definitely attributable to malnutrition. Skim milk powder as a supplement to corn is often considered an ideal dry lot ration. In group IV a ration composed of 50 per cent skim milk powder did not produce normal animals. Degeneration of the gonads and myelin sheaths were present in all of the animals in group IV. In general, these animals had only slight degenerative changes in the kidneys and liver. Kidney lesions were more marked in pig 849 than any of the others in group IV.

An observation frequently made on group IV was the intense thirst of these animals. Aubel, Hughes and Leinhardt[12] reported on the increased desire for water on phosphorus deficient pigs. Hughes[11] observed an increased thirst in calcium deficient animals. Both calcium and phosphorus were high in ration IV, yet these animals consumed large quantities of water and suffered greatly on very hot days.

SUMMARY

1. The results of chemical determinations on the blood of pigs receiving vitamin

C and those not receiving vitamin C indicate that this species has the ability to synthesize this vitamin.

2. A tendency to low serum proteins and serum calcium is found in pigs receiving rations low in these substances.

3. The inorganic phosphorus of the plasma or serum of these pigs tends to indicate a suboptimal phosphorus content of the first three rations used.

4. A low hematocrit was found in the pigs fed rations composed largely of corn.

5. The absence of nutritional edema in pigs with very low serum protein is noted.

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Publicity for Swine Practice

The advertisements are running in 13 farm publications with a circulation of more than 3,000,000 readers. They will appear in the September and October issues and will follow the style of copy used in a similar campaign carried on last spring.

The association's bureau, The American Foundation for Animal Health, is also issuing a series of news releases to the press on the subject of hog cholera and warning farmers to have their hogs immunized before outbreaks occur.

Fourteen radio stations in leading hog producing states are also coöperating with the Foundation in carrying brief broadcasts on their farm programs, urging watchfulness against livestock diseases and the importance of calling qualified veterinarians at the first sign of illness.

Animal Chemical Society

The 96th annual meeting of the American Chemical Society was held in Milwaukee, Wis., on September 6. Dr. Marston Taylor Bogert, of Columbia University, was awarded the Priestly medal, highest award of the society. Dr. Bogert's award was based upon his work with sex hormones. The indication that clinical science is moving swiftly toward a cure for human and animal sterility has been given wide publicity by the lay press.

Hog Cholera Advertising Campaign

A new series of advertisements in the farm and livestock press, issuing warning against fall outbreaks of hog cholera and urging livestock owners to have their hogs immunized by qualified veterinarians is being started this month by the Associated Serum Producers.

Revised Drug Law

From the United States Department of Agriculture comes the information that the month of July saw the beginning of enforcement operations under the Federal Food, Drug and Cosmetic Act of 1938, which within a year will supplant the 32-year-old Federal Food and Drugs Act. Dangerous drugs are immediately subject to the new law. Dangerous or worthless additional preparations should be promptly reported.

Fined for Dehorning

In Scotland, a farmer was fined 20 pounds and a farm servant two pounds for dehorning 31 head of cattle without the use of an anesthetic.

Kidney Damage in the Dog Produced by Mercury Poisoning*

By DAVID F. GREEN, JAMES B. ALLISON *and* W. R. GREENWOOD, *Department of Physiology and Biochemistry, Rutgers University*† *and* M. L. MORRIS, *New Brunswick, N. J.*

Most toxic substances which enter the body of an animal are excreted in one form or another through the kidney. Damage to the kidney is often produced by these toxic substances, which may be of bacterial origin or they may come from other sources and be called poisons. The kidney of the dog is very susceptible to this type of damage because the constituents of the urine are so highly concentrated by the tubule cells. If renal insufficiency is produced by these toxic substances, the clinical symptoms are all quite similar, so that the origin of kidney damage is very difficult to determine. This difficulty can be illustrated by presenting the symptoms of two cases of mercury poisoning. These symptoms can be compared to those usually associated with impaired renal function.

Description of a Case of Mercury Poisoning

The first case of kidney damage which we identified as due to mercury poisoning was a 4 year old smooth-hair fox terrier male. The dog weighed 7.3 kilograms. When this animal was presented at the hospital, the temperature was normal. The ears, teeth, tonsils, throat, glands and skin all appeard to be in good condition. The animal was thin. The breath was fetid and had an ammoniacal odor. The blood urea was high, 110 milligrams per cent. The urine was straw colored and acid, with a specific gravity of 1.013. The volume was normal. The sugar and indican tests were negative, but the albumin test was plus one. The uric acid concentration of the urine was normal. The sediment contained a few leucocytes, occasional granular casts, some bladder epithelial cells and a slight amount of mucus. The animal vomited frequently. At first, the vomitus was bile stained and contained mucus but after the dog had been in the hospital for about three days the vomitus contained fresh blood. The temperature gradually dropped over this period of three days to 98.6° F. at which time euthanasia was permitted. The autopsy showed the presence of a hemorrhagic, gelatinous swollen mucosa in the fundus of the stomach which suggested the presence of some irritant like bichloride of mercury. The swollen rugae of the stomach gave a positive test for mercury.* The other tissues, including the kidneys,† appeared normal grossly. All of the glomeruli and most of the tubules appeared normal microscopically. An occasional tubule was swollen and edematous. Certainly the tubular damage was well within the reserve limits of the kidney so that the urine should have been normal.

Method of Testing for Mercury in the Stomach Wall

The method used to analyze for mercury in the stomach wall is given in detail as follows: Remove ½ inch square of the hemorrhagic, gelatinous swollen rugae. Cut the square of tissue into smaller pieces and place them in a test tube with about 5 cc of concentrated hydrochloric acid. Allow to stand three to four hours or until most of the pieces are dissolved and then filter. Add a coil of copper wire to the filtrate. The coil may be made by wrapping 32- to 34-gauge bare copper wire around a lead pencil. It should contain about six coils.

*Received for publication, August 22, 1937.
†Much of this work was made possible by a fellowship established at Rutgers University by Merck and Company, Inc., Rahway, N. J.

*These procedures are adopted from the method of Bardach described in "Detection of Poisons," by Autenrieth, translated by Warren and published by P. Blakistons Sons and Co., Philadelphia, Pa. The only addition made to Bardach's method is in the preparation of the sample from the stomach wall.

†The pathology of the kidneys will be described in detail by Dr. Greenwood elsewhere.

Allow the coil to stand in the strong hydrochloric acid solution of the stomach rugae for about two hours. Remove the coil and wash it twice with water. Rinse it with alcohol and then with ether. After the coil dries, compress and place it in the bottom of a clean, dry test tube about 8 to 10 millimeters wide. Add a bit of crystalline iodine about twice the size of the head of a pin. Heat gently until the iodine has vaporized and then heat the tube to dull redness. The iodine will react with the mercury that has been plated out on the copper wire to form mercuric iodide. At a temperature when the test is dull red, the mercuric iodide will be volatilized and will condense on the cooler walls of the tube. A yellow to reddish ring of mercuric iodide will be visible, if the stomach rugae contained mercury.

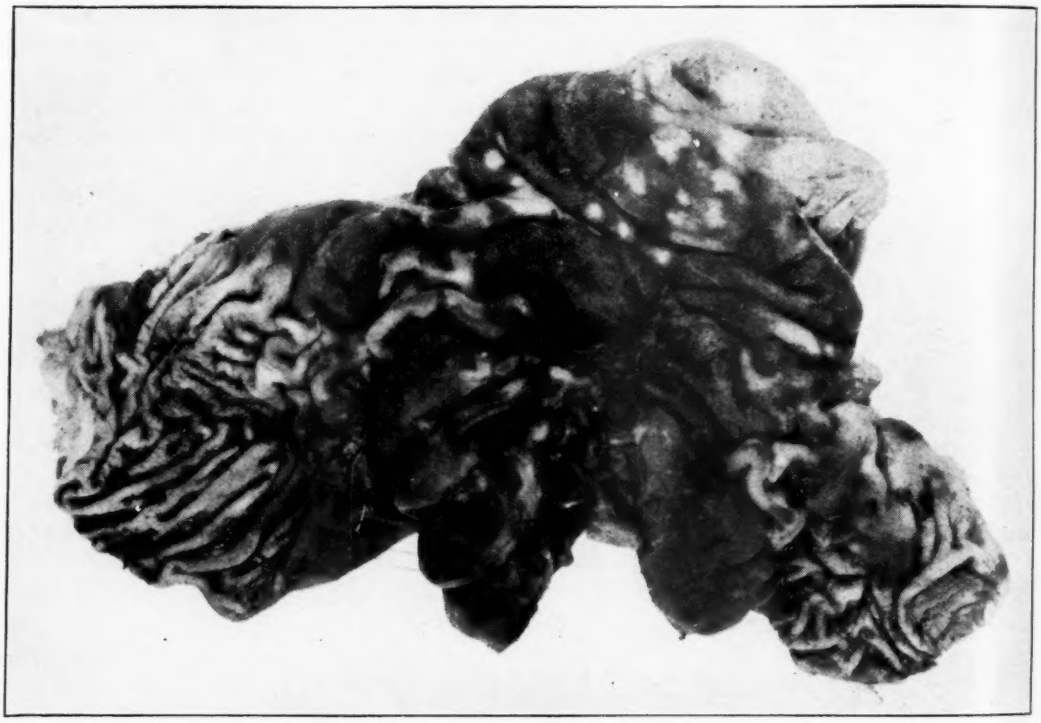

Fig. 1. Kidney damage in the dog from mercury poisoning.

METHOD FOR TESTING FOR MERCURY IN THE URINE

When poisoning of this type is suspected, we recommend a urine examination for mercury. To make this analysis, place 500 to 800 cc of urine in a liter florence flash. Gradually add 1 gram of dried powdered egg albumin with constant shaking. Mix from time to time during the next half hour. Render the urine acid to litmus by using 30 per cent acetic acid, (human urine takes 5 to 7 cc). Suspend in a boiling water bath for 15 minutes and then filter while hot through a rather small filter. Drain the precipitate thoroughly and spread this filter paper out on two other sheets of filter paper to remove some of the remaining moisture. Transfer the filter paper used for filtering with the precipitate, to a 125 cc erlenmeyer flask and add 10 cc of concentrated hydrochloric acid. Add a coil of copper wire made from 1 foot of 32- to 34-gauge bare wire. Cover the flask with a funnel or watch glass and suspend the flask in a boiling water bath for 45 minutes. Cool the flask and pour off the acid. Wash the coil two to three times with water and then rinse with alcohol and ether. When the coil has been dried, compress it into a small

piece and place it in a glass tube 6 inches long which has been sealed at one end. The coil should slide freely to the bottom of the tube. Add a small crystal of iodine and heat gently until the iodine is vaporized. Then heat to dull redness. The characteristic yellow or reddish ring of mercuric iodide will appear if the urine contains mercury. This method is reported to be sensitive to 0.025 to 0.05 milligram of mercury.

A SECOND CASE OF MERCURY POISONING

The second case was a four or five year old German shepherd male. When this animal was presented to the hospital, it had been ill for approximately ten days. The ears, eyes, and throat were normal. The animal's breath had a strong ammoniacal odor. The buccal mucous membranes were dark and abnormal in appearance. The blood-urea nitrogen was 145 miligrams per cent. The urine was acid and of a straw color. The specific gravity was 1.010. The albumin was +3 indican +2 and sugar negative. The sediment contained many leucocytes, amorphous crystals and some squamous epithelial cells. The concentration of urine uric acid was 3 milligrams per cent, which is within the normal range. The dog vomited frequently. The vomitus contained blood. The animal developed an anuria the second day in the hospital.

The autopsy showed hemorrhagic, gelatinous swollen mucosa in the fundus of the stomach. It was so similar in appearance to the condition found in the fox terrier that a test for mercury was performed. The test was positive. The other tissues of the body appeared normal except for the kidneys. They showed almost complete destruction of the tubular epithelium, which occluded the lumen of the tubules. Even the glomeruli were swollen. The capsular membrane was completely occluded. Microscopic section certainly would predict a complete loss of the kidney function.

DISCUSSION

The history of both of these cases of mercury poisoning suggests that some compound of mercury, probably the bichloride, was administered to these dogs in the form of a pill, which naturally reached the fundus of the stomach. These pills would slowly distintegrate and the mercuric salt would react with the tissue proteins. The mercury-protein complex would be absorbed and eventually some of it would be excreted by the kidney. There was no indication of liver damage in either dog, since the urine uric acid was within the normal range. Tissue damage was not observed except in the stomach wall of both dogs and in the kidneys of one. In both dogs, however, the high blood urea and the low specific gravity of the urine indicated kidney damage.

Sulfanilamide, urea, and creatinine clearances were determined in the fox terrier. The average urea clearance at a urine flow of 1 cc per minute per square meter of surface area was only 5.8 cc which can be compared to the normal value of 40 cc. The creatinine clearance was correspondingly lowered to approximately 7 cc. The permeability of the kidney cells had been altered and the renal function impaired by excretion of mercury complexes. It is interesting to note that there is this marked change in permeability and yet microscopic examination does not reveal much damage. It was impossible, however, from clinical symptoms and routine laboratory procedures, to differentiate this animal from some others that were suffering from impaired renal function due to causes other than mercury.

Attempts to measure the urea and creatinine clearances in the German shepherd dog failed because of the anuria which developed soon after the function test was started on the second day of hospitalization. Previous to this time the urine flow had been above normal. This sudden appearance of anuria, together with the presence of fresh blood in the vomitus, were the only conditions which to us suggested poisoning. In fact, the clinical symptoms were in many respects similar to those described for dogs suffering from hemorrhagic gastro-enteritis and so-called canine typhus.

SUMMARY

1. Two dogs which were poisoned with a compound of mercury were studied. In both animals, the mucosa in the fundus of the stomach was hemorrhagic, gelantinous and swollen.

2. A method for preparation of a sample of the stomach wall for analysis for mercury is described and Bardach's method for detection of mercury is given in detail.

3. The kidneys were both badly damaged by the poison. Microscopic appearance of one kidney, however, was normal while the other showed extensive destruction. Other tissues appeared normal.

4. The difficulty of identifying the etiology of kidney damage is emphasized.

The Fourth International Congress of Comparative Pathology

The Fourth International Congress of Comparative Pathology will meet in Rome, from May 15 to 20, 1939, under the official auspices of the Italian government, with headquarters at the National Council for Researches, Piazzale delle Scienze.

The Squibb Institution for Medical Research

E. R. Squibb and Sons have announced the establishment of the Squibb Institution for Medical Research, for which a laboratory building in New Brunswick, N. J., has been erected at a cost of $750,000. It is planned to dedicate the laboratory in October.—*Science.*

Doctor M. Jacob Honored

Doctor M. Jacob, our own beloved treasurer, who has served in that capacity for 20 years, has this year been honored by being elected president of the Tennessee Valley Agricultural and Industrial Fair, which is to be held September 26 to October 1, 1938, at Knoxville, Tenn. From the program and premium list just received, we would judge that this will be an outstanding event of its kind in the South.

Erratum

Word has just reached the JOURNAL office that Dr. William J. Lentz should be given credit for originating the "Treatment for Tapeworms," described on page 156 of the September issue.

Farm cash income in July is estimated by the United States Department of Agriculture, Bureau of Agricultural Economics, at $609,000,000.

Iowa State's New Statue

One of the Midwest's finest sculptors has been commissioned to make a statue to be called "The Veterinarian," which will eventually occupy the veterinary quadrangle at Iowa State College.

Quoth the Editors of *Successful Farming*, " 'The Veterinarian' typifies the fine type of man who makes up our veterinary profession today. Like the country doctor, he is motivated by the spirit to serve humbly and to save life. Let us give our veterinarians the respect and consideration they so richly deserve."

Bacteriologist Wins Award

At the president's banquet of the Society of American Bacteriologists, which was held on August 31, Dr. Jerome Syverton was presented with the Eli Lilly award of $1,000 and a bronze medal, offered annually to the young man or woman who makes the most outstanding contribution to knowledge of bacteriology or immunology in American college research.

Dr. Syverton won his award by his original research in the field of equine encephalomyelitis. He discovered that the disease is not directly contagious but carried underground by gophers and then transmitted to horses by ordinary woodticks.

No man has a good enough memory to be a successful liar.—Abraham Lincoln.

IRREGULAR STRANGLES TRANSMITTED BY COITUS*

By CHARLES H. HAASJES, *Shelby, Mich.*
and DONALD H. DICKIE, *Lansing, Mich.*

A considerable amount of cases of irregular strangles have occurred in mares in the territory adjacent to Shelby, Oceana county, Mich. A stallion owner, who has two Belgians and one Percheron, evidently spread the infection through his breeding activities. The two Belgian stallions were affected with strangles during the spring months and were treated for the infection. The evidence is that all three stallions spread the infection, although the Percheron never showed any symptoms of the disease.

This year, the stallion owner bred over 200 mares with the three stallions. About a dozen of these mares developed irregular strangles, thought at first to be genital horse-pox (coital vesicular exanthema) until some of the cases developed grave symptoms.

In about ten days or two weeks, the first abscess developed, located half way between the upper and lower commissures of the vulva and about one inch from the edge of the vulva lip. After the appearance of the first abscess, more developed around the anal and perineal regions and on the udder. Nine calls were made to lance 13 abscesses on one mare. Usually these abscesses were large, containing as much as two quarts of pus. The whole hand could be introduced into the abscess cavity after the pus had been drained out.

Examination of the stallions did not disclose the reason for the irregular form of strangles. The bacteriological examination, made by the Michigan Department of Agriculture laboratory, disclosed a streptococcus which could not be differentiated from *streptococcus equi* found in regular strangles. In suckling colts, the infection produced the regular form of strangles.

The irregular form of strangles has been rather infrequent during recent years. That is the reason why we are reporting this outbreak in Michigan.

*Received for publication, September 2, 1937.

IMPROPER CARE OF MARE IN FOAL*

By CHAS. HAASJES, *Shelby, Mich.*

Early breeding of a 6 year old Belgian mare was advised. She was bred in April, 1936, so foaling time would fall during March of the next year. On account of icy yards and deep snow, the mare was not given any exercise during the winter. The following February dropsical swellings appeared in the legs and on the lower part of the abdomen extending forward under the thoracic cavity. Very little could be done to reduce the swelling without exercise.

On March 14, 1937, I was called to assist in delivery of the foal, which was found partly protruding on my arrival. After delivery of a dead colt, the vaginal walls were found to be badly bruised. Stimulants were given to the animal and the injured parts were irrigated. On the fourth day, the mare was placed in a sling. The following day the swelling had disappeared, but the vulva was so contracted that manual examination of the vagina was impossible. The next day, extensive sloughing appeared. She died on the seventh day after foaling. A postmortem examination revealed extensive damage to the vulva and posterior part of the vagina, followed by an infection which resulted in gangrene.

*Received for publication, September 10, 1937.

MULTIPLE FOCAL EPITHELIAL HYPERPLASIA OF THE ESOPHAGUS OF A CHICKEN*

By WILLIAM H. FELDMAN
Rochester, Minn.
The Mayo Foundation

In the course of necropsy of a tuberculous chicken there was observed an unusual condition in the mucosa of the esophagus which perhaps warrants brief description.

The chicken was an adult hen that had died, apparently as a consequence of tuberculosis. Necropsy revealed extensive lesions of tuberculosis in the liver, spleen, intestines, bone marrow and lungs. When the esophagus was opened longitudinally, the mucosa was found to be studded with numerous flattened grayish, white-miliary foci which, at first, were erroneously considered to represent a tuberculous involvement of the esophagus (figure 1). The majority

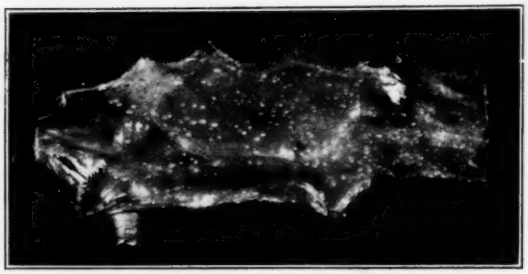

Fig. 1. Numerous foci of epithelial hyperplasia.

of the lesions of the esophagus measured approximately 0.1 cm in diameter and were rather evenly distributed in the mucosa throughout the entire length of the anterior (first portion) of the organ. The trachea was not affected.

Sections were prepared from different levels of the esophagus and on microscopic study the nontuberculous character of the lesions was immediately apparent. The lesions consisted of collections of epithelial cells between the mucous and the inner portion of the structure which had undergone retrogressive changes and only narrow strands of hyalinized tissue remained (figure 3). The stratum germinativum was plainly evident at the peripheral portions of the various lesions. Mitosis or other signs of aggressive, unrestrained growth were not observed. The unaffected portions of the esophageal mucosa consisted of atrophic stratified epithelium in which the usually conspicuous alveolar glands were absent.

The explanation for the occurrence of lesions of this character is not entirely evident. That the changes were related in any way to the tuberculous state of the fowl is hardly tenable. It is likewise impossible to explain the occurrence of lesions on the basis of an embryonal mishap. It seems more likely that the lesions developed

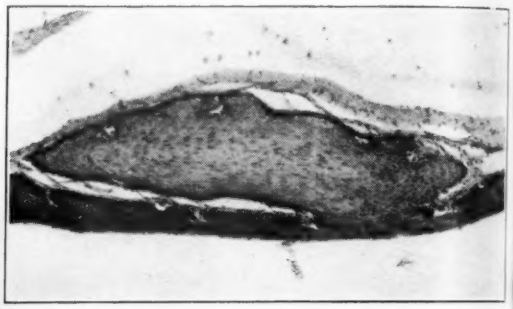

Fig. 2. Extension of epithelium into the submucosa zone (× 100).

as a consequence of some postnatal stimulus.

In this regard, the similarity of the lesions in this case with those described by Seifried[1] in the presence of deficiency of vitamin A is worthy of comment. Seifried, in describing the changes in A-avitaminosis affecting chickens, mentioned the replacement of the original epithelium of the esophagus by epithelium which had a marked tendency to keratinize. The atrophic, stratified character of the mucosa of the esophagus in the case under discussion would suggest deficiency of vitamin A as the factor most likely to be responsible for the condition. The submucous situation of the respective epithelial foci can be explained on the basis of involvement of the submucous glands, in which the original epithelial structures have undergone metaplasia similar to that involving the mucosa of the esophagus. The absence of every

*Received for publication July 27, 1938.

remnant of mucous glands in the mucosa strengthens the argument in favor of the belief that the foci of hyperplastic epithelium in the submucosa represent what were originally glandular structures.

If the lesions in this case were the result of deficiency of vitamin A, they are of interest in that they depicted the changes

Fig. 3. Retrogressive changes (× 100).

long after the acute manifestation of the disease had subsided. The character of the lesions was such as to make it unlikely that they would eventually disappear even though the life of the fowl had been extended for a prolonged period.

SUMMARY

Apparently benign, multiple, focal, epithelial hyperplasia of the mucosa of the first (anterior) portion of the esophagus was found in a chicken. The lesions consisted of discrete collections of epithelial cells forming oval, plaque-like structures between the mucosa and the inner muscular layer. It is not unlikely that the changes represented the residual effects of previous A-avitaminosis.

REFERENCE

[1]Seifried, O.: Studies on A-Avitaminosis in chickens. II. Lesions of the upper alimentary tract and their relation to some infectious diseases. Jour. Exp. Med., lii (1930), pp. 533-538.

The only man who behaves sensibly is my tailor. He takes my measure even every time he sees me, whilst all the rest go on with their old measurements, and expect them to fit me.—*Bernard Shaw, Man and Supervisor (Constable).*

THE USE OF BABCOCK CREAM TEST BOTTLES IN THE FLOTATION OF PARASITE EGGS

By R. F. BOURNE, *Fort Collins, Colo.*
Colorado State College.

The diagnosis of parasitism by the centrifugal separation and flotation of parasite eggs in fecal mixtures is a practice widely followed, not only in clinical laboratories, but also very commonly by practicing veterinarians.

Chief among the reasons for the failure of practitioners to more widely use this aid to accurate diagnosis, is the feeling that they do not have the necessary equipment. As a matter of fact, little equipment is required, aside from a microscope and a few pieces of glassware. Even centrifugation may be dispensed with, the flotation being accomplished by natural gravitation. Test tubes containing the fecal mixture may be set in a cold place to retard segmentation changes and examined the following day with very good results.

The usual procedure is to reduce the feces to a soupy consistency by the addition of water. Then transfer equal volumes of the strained fecal material and the standard solution of sucrose (1 pound to 12 fluid ounces of water) to the regular cylindrical centrifuge tubes and whirl for five minutes or more at a speed of 1,200 to 1,800 r.p.m.

Many practitioners do not have a laboratory centrifuge, but do have access to the Babcock centrifuges used in milk testing. Such a centrifuge may be used to carry cylindrical tubes by properly padding and supporting these in the regular centrifuge cups. However, the regular cream test bottles are not only better adapted to the standard cups, but have other advantages as well.

For many years we have used 9 gram Babcock cream test bottles for all routine fecal examinations for the following reasons: First, a more generous sample can be employed because of the larger capacity of these bottles; second, any ova or coccidia present will be concentrated in the narrow neck of the bottle and are less likely to be overlooked; third, the standard Babcock equipment is cheaper and more widely available than special laboratory equipment.

*Received for publication,

(The bottles may be used even if no centrifuge is available).

Milk test bottles are not satisfactory because the narrowness of the neck makes filling, sampling and cleaning more difficult.

TETANUS IN A PIG

By FORREST MCCLEAD, *Huntington, Ind.*

Subject: A cross bred Duroc Poland China barrow weighing about 50 pounds.

History: Three pigs were in the lot, two gilts and the sick barrow.

The barrow was castrated ten days or two weeks previous to my call. This pig had been sick three or four days before I saw him.

Symptoms: This pig moved when forced to do so. He walked up on his toes, back slightly arched, gait very stiff. He made a peculiar, weak, grunting sound all the time he was up moving around. He had not been able to open his mouth wide enough to eat ear corn for two or three days. He could take some shelled corn and water from slop.

The *membrana nicitans* was rather prominent. The pig was excitable. The castration wound was completely healed with no evidence of any infection.

Diagnosis: Tetanus.

Treatment: The owner was advised to place this pig in a stall by himself. The stall was fairly dark, dry and cool. The pig was given milk to drink in which 1 teaspoon of chloral hydrate solution (1 dram of chloral to 1 ounce of water) was placed. This was given three times daily. The pig made a complete recovery in ten days.

*Received for publication, Aug. 16, 1938.

Tetanus in a pig. Effect of chloral hydrate treatment.

American Public Health Association Program

The scientific program of the 67th annual meeting of the American Public Health Association will be held in Kansas City, Mo., October 25-28, which will engage the attention of more than 3,500 of the nation's health authorities, indicating how closely the organization's Program Committee has been following national trends toward public health progress.

U. S. Cares for Sick Ducks at Hospital

Western duck sickness brings painful death each year to millions of waterfowl in the alkaline wastes of western states. To reduce these losses, the U. S. Biological Survey opened a refuge and hospital for migratory birds on the shore of Utah's Great Salt Lake. Here last year 6,000 sick wild fowl were treated, restored to health, and set free.—*Science & Industry.*

PARTURIENT PARESIS*

By J. W. KUMMER, *Hastings, Minn.*

An ambitious and generous young neighbor, who had previously assisted me in several cases, suddenly turned professional. By the time I had answered the call to see this cow the udder had been inflated and ligated. I questioned this man regarding his methods. He informed me that he had been clean and careful. I gave the cow the usual stimulant and left the usual amount to be given by the owner. The animal was on her feet in three hours, apparently recovered. In 24 hours, the udder was swollen, hot and painful. Temperature 105° F., pulse rapid, breathing accelerated, patient trembling when standing, udder contents watery and foul-smelling.

On the occasion of my second call, I gave the cow ½ pound of epsom salts in one quart of water and a one-ounce capsule of formaldehyde. I also gave hot applications to the udder, stripping her every two hours. Stimulants were given every four hours. After twelve hours, the treatment was repeated. Altogether, the animal received one pound of epsom salts in two doses, five ounces of formaldehyde in three doses, twelve hours apart, and stimulants every four hours. Recovery was uneventful.

A similar case came to my attention 36 hours after having been treated by the owner. The patient was barely able to stand. Temperature 105½° F., pulse rapid, breathing accelerated, udder swollen, hot and painful. Contents watery and foul-smelling.

I gave ½ pound of epsom salts as drench, and a one-ounce capsule of formaldehyde. Shortly after giving the capsule, the animal trembled convulsively. Saliva commenced drooling from the mouth and the eyes watered. She passed a large quantity of urine. The breathing became faster and she was a picture of distress. This sudden turn of events rather upset me. I expected to see the patient collapse at any moment but she did not do so. After what seemed like five minutes, I smelled the breath of the patient but could detect no odor or formalin. After an hour, the patient was considerably easier. My conclusion is that the top came off the capsule while in the mouth of the cow. Since I was not requested to make a return call, I presume that recovery was uneventful.

The following is my treatment for a typical case of parturient paresis. Inject ½ ounce of the following preparation slowly under the tongue, with dose syringe.

Fluidextract of nux vomica....	15.00
Fluidextract of digitalis.....	15.00
Tincture of strophantus.....	45.00
Sweet spirits of nitre gs.....	120.00

Next, raise udder, placing a clean gunny sack doubled under it. If help is available, I have one man kneel astride the upper hind leg, holding it to prevent the patient from kicking. Another man should steady the head.

I cleanse teats with a fairly hot antiseptic solution, then mop them dry with sterilized cotton. The quarters should be milked dry, very dry. The teat tube should be kept in a hot, antiseptic solution until ready to insert. Before use, pump air through the tube to remove all solution. I inflate the udder until the teats become firm, then ligate with a gauze bandage. The patient is placed in a comfortable position, and protected from the sun in hot weather. Covering is requested according to weather and housing conditions. I inject another ½ ounce of stimulant at this time, which is usually about an hour after the first injection.

Instructions: Remove one half of the air in 16 or 18 hours. Twelve hours later, about the same amount is to be removed. After that, if the cow is doing nicely, milk at regular hours. It is best to feed about one-half the usual grain ration for one week.

*Received for publication, August 28, 1937.

Good-Will

The disposition of a satisfied client to return to the place where he has been well treated.

CHRONIC SEPTICEMIA IN A WATER BUFFALO*

By GREGORIO SAN AGUSTIN, *Manila, P. I.*
College of Veterinary Science,
University of the Philippines

The following case may prove interesting for the reason that no definite diagnosis could be made on the basis of clinical symptoms and postmortem findings, which were not clear enough to account for the death of the animal. However, isolation of bipolar organisms from the spinal fluid and the course of the disease point to the fact that this may be a case of an atypical or chronic septicemia.

CLINICAL RECORD

On September 25, 1936, a female carabao (water buffalo) about 5 years old was brought to the clinic of the College of Veterinary Science for treatment. The caretaker informed us that for the past two weeks the animal appeared dull. A swelling was present on the ventral portion of the neck and abdomen. The attendant applied tincture of iodine to the swollen parts of the skin, but this treatment did not alleviate the condition.

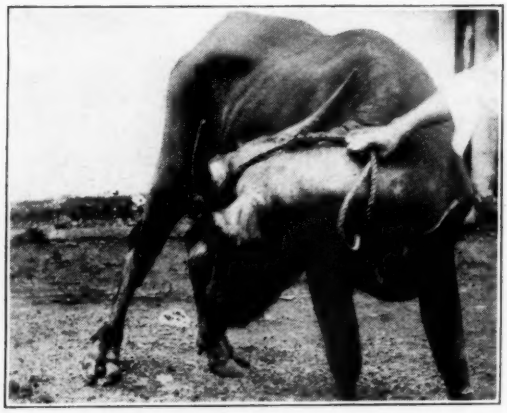

Fig. 1. Animal turning to right side.

When first examined, the carabao appeared dull and emaciated. There was an edematous swelling on the ventral part of the neck. The mucosa of the eyes, nostrils and mouth were congested. The animal was very badly infested with lice. In fact, its poor and seriously depressed condition was attributed to the presence of lice. Pediculosis was, therefore, given as a tentative diagnosis.

White liniment was applied to the swollen ventral part of the neck. The animal was bathed with a 5 per cent solution of acetic acid, followed with 1 per cent lysol.

The following day, a grayish-white nasal discharge was noted coming out from both nostrils. The hair was clipped and then a bath of tobacco decoction was given. When the nasal discharge appeared, a subcutaneous injection of 15 cc of camphorated creosote was also administered. The animal was force-fed with gruel and grass. Force-feeding was continued up to the time the animal died.

For three days the carabao was given a bath of tobacco decoction. Pyrethrum powder was applied to the legs. It helped considerably in eliminating the lice and their eggs. The following tonic was also prescribed:

Tincture of nux vomica	10
Fl. extract of gentian.....	30
Aromatic spirit of ammonia.	30
sodium bicarbonate	15
Water	100

M. et ft. sol.
Sig. Give at once in a drench.

This internal administration was continued for four days, with the exception that the amount of tincture of nux vomica was reduced during the last three days. For two days following the administration of this tonic, the animal became more lively. The heart beats were noticed to be stronger, but on the third day the heart action and intestinal peristalsis were weakened.

On September 30, a change in the attitude of the animal was noticed. Using her right hind leg as a pivot, the carabao turned toward the right (figure 1). The neck was bent toward the right side also. Suspecting that some of the lice or other insects must have entered the ears, particularly the left ear, thereby causing the abnormal behavior, the ears were cleaned with 5 per cent boric acid and then swabbed with glyceride of iodine.

The following day, the animal continued to move toward the right with the neck bent on the same direction. The animal appeared dull and absent-minded. There was a loss of sensation in the coronary region of the feet. At times the forelegs crossed each other. There was loss of leg coördination,

*Received for publication, January 13, 1937.

causing the patient to strike interfering obstacles in its path.

The same treatment of cleansing the ears with 5 per cent boric acid, followed by the application of hot oil of hyocyamus, was given. It was noticed that the animal flinched more when the left ear was being cleaned. Hot water fomentations were applied to the poll and the base of the right ear.

During the course of the disease the temperature varied from 38.2° to 39.8° C.

On October 2, the animal laid down on its sternum with all four legs gathered under the body with the neck bent toward the right side (figure 2.) At times the muzzle touched the right flank in a position closely resembling that of parturient paresis. Occasionally, the animal rolled slightly so that the entire left side of the body came into contact with the ground. In such a position, the head rested on the right chest, with the legs extended. This position was accompanied by rolling of the eyeballs, the pupils being hidden, while the congested white part of the eyeballs became visible. Occasionally, the animal would struggle violently for a while until it gained its former position. Respirations were frequent, deep and of the abdominal type. The nostrils were dilated. The nasal mucosa was injected. The animal ceased entirely to eat. At this stage, the animal was given a subcutaneous injection of 30 cc of a 4 per cent solution of atoxyl. The following day, although the animal was still lying down in the same position, it appeared livelier and chewed its cud.

During the succeeding days, until its death, the animal did not show any improvement. The same symptoms were manifested as noted above. In addition, the eyes did not readily respond to stimuli. Some filaria were found in the conjunctival sac over the eyeballs. Respirations were deep and slow. The skin of the back and neck were edematous and admitted finger imprints. When force fed, there was great difficulty in swallowing. Sometimes the feed dropped on the ground without being masticated.

Accordingly, the following treatment was instituted. On the morning of October 4, a subcutaneous injection of 20 cc of a 4 per cent solution of atoxyl was given. A hot water fomentation was applied to the edematous skin. Six blood smears were made. Three were stained with giemsa's stain and the other three with methylene blue. Microscopic examinations were negative. In the afternoon of the same day, a subcutaneous injection of 15 cc of camphorated creosote was given.

The treatment was continued, but without results. On October 5 (10 days after the animal was brought to the clinic), at about 10:30 a. m., 1 grain of strychnine sulfate dissolved in 5 cc of distilled water was injected subcutaneously. Five minutes after the injection, a slight reaction followed. The animal was hypersensitive, showing spasms of the muscles. Respirations were rapid and shallow. The nostrils were unusually dilated. After 30 minutes, the respiration became slower and deeper, and occasionally conclusive.

In the afternoon of the same day, about 2:00 o'clock, another subcutaneous injection of 1 grain of strychnine sulphate was given. The symptoms observed in the morning were manifested in a more violent manner. The animal died that evening. The neck was bent backward so that the ventral part of the head was uppermost (figure 3). Postmortem examination was performed on the following morning.

Fig. 2. Marked exhaustion.

AUTOPSY FINDINGS

External examination: The eyes were open. The mouth was also open, lips retracted. The vulva was swollen, showing a slight serous discharge. The abdomen was enlarged. *Rigor mortis* was present.

Internal examination: The subcutis was pale and dry. The blood was dark red and coagulated. The peritoneum was roughened. The omentum was petechiated. Fat

necrosis was found posterior to the diaphragm. The rumen contained partly macerated grass and many parasites (*paramphistomum cervi*). The reticulum contained macerated grass and two pieces of wire, each about 3 inches long. The epithelium was quite adherent. The omasum was practically empty and the mucosa was dry. The small intestines were distended, the mucosa being congested. The contents were seromucoid and yellow in color. The messenteric blood vessels were injected. The serosa of the caecum, containing green-colored macerated grass, was reddened, and the mucosa was injected with occhymoses.

The spleen was grayish-blue in color, with evidence of cloudy swelling. The stroma was dark red and slimy. The kidneys were flabby, soft and had a cooked appearance. The urinary bladder was distended with urine. The liver was dome-

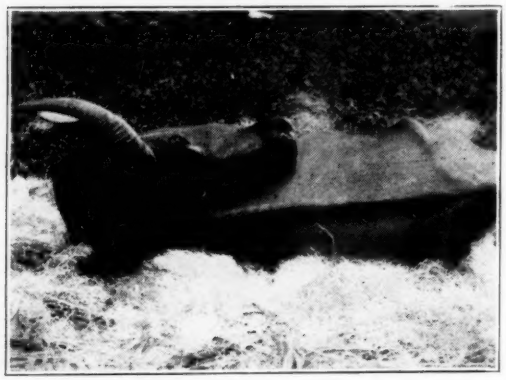

Fig. 3. Twelve hours after death. Note position of neck.

shaped, emphysematous, doughy and rough, due to the presence of fibrous threads. The stroma was quite tough. The gall bladder was distended with thin, watery, yellow bile.

The pleural cavity was pale and glistening, containing a certain amount of sero-sanguinous fluid. All chambers of the heart were filled with dark, coagulated blood. Fat clots were found in the auricles and the left ventricles. The endocardium was reddish-black, while the valves were dark red in color. The heart muscle was very soft, emphysematous and had a cooked appearance. The pericardium contained about 200 cc of sero-sanguinous fluid. All lobes of the lungs were emphysematous, with the exception of about one-fourth of the anterior portion of the cephalic lobes which were crepitant. The trachea and bronchi were filled with frothy fluid. The mucosa was congested.

The left temporal muscle was hemorrhagic. The prescapular lymph glands were enlarged. There was a slight congestion of the brain, the right side being more reddened than the left.

BACTERIOLOGICAL EXAMINATION

Spinal fluid was obtained from the animal and some of this was smeared on agar plates to obtain cultures. Three organisms; bipolars, bacilli and staphylococci, were isolated and cultured. A white rat was used to test the pathogenicity of each organism, numbered 1, 2 and 3. Five days later, rat number 1 was found dead in the afternoon. The animal was posted immediately. The following lesions were found: Fibrinous peritonitis and pleuritis, enlarged spleen and liver. Smears from the spleen, liver and heart blood revealed the presence of bipolar organisms. Rats number 2 and 3 did not die.

On November 1, 1 cc of a 24 hour culture of the bipolar organisms recovered from rat number 1 was injected subcutaneously into rats number 2 and 3. On November 5, rat number 2 was lively, while rat number 3 was found dying. The latter was killed and immediately posted. The lesions consisted of fibrinous peritonitis, pleuritis, and pericarditis. Again, bipolars were recovered from the heart blood.

On the basis of these findings, the case was diagnosed as one of chronic septicemia.

World's Poultry Congress

Information has reached the JOURNAL office that the World's Poultry Congress, to be held in Cleveland, Ohio, takes place between July 28 and August 7, 1939.

Erosion Control

Native wheatgrass has been proven the best aid to runoff and erosion control thus far found on ranges in the Intermountain region which includes southern Idaho, Nevada, Utah and southwestern Wyoming, according to a report of the U. S. Forest Service.

A GUIDE TO VETERINARY PARASITOLOGY FOR VETERINARY STUDENTS AND PRACTITIONERS. T. Southwell, D.Sc., Ph.D., and A. Kirshner, M.B., Ch.B., D.T.M. 1st edition. x+144 pages, with 88 illustrations and 12 diagrams illustrating life histories. H. K. Lewis and Company, London, W.C. 1, 1937. Cloth 800, 7s. 6d.

This small book on veterinary parasitology is intended not only for students, but also for practicing veterinarians. It represents, in a condensed form, the lectures which have been given during the last 20 years to veterinary students at the Liverpool School of Tropical Medicine (University of Liverpool).

The authors have recognized the fact that there are so many parasites in domestic live stock that, even in a large book, it would not be possible to deal adequately with them all; this being especially true of the parasitic nematodes. Therefore, they have selected only those species, pathogenic and harmless, which the veterinarian is most likely to encounter. They have deliberately avoided lengthy descriptions of the morphology of the various parasites, and have stressed only those points which are of diagnostic value. Neverthless, they are sufficient for the requirements of the student and the trained veterinarian. In each section, very brief accounts of the pathogenicity of some of the more important parasites are given. Suitable prophylactic measures are also indicated.

This is one of the best handbooks on parasitology that has come to the attention of the reviewer, who is enthusiastic about the arrangement of material. Students and practitioners alike will appreciate the convenient classification tables for differential diagnosis that accompany each chapter. There is a double page showing helminth eggs, drawn to show relative sizes and the more important anatomical details that will be found to be the acme of convenience when making fecal examinations. The busy practitioner will also appreciate the twelve diagrams illustrating life histories.

The chapter on parasites of meat and fish, the host-parasite list and the helminth eggs drawn to show relative sizes and the more important anatomical details, make this volume of particular value as a reference book.

The American veterinarian will, no doubt, prefer to substitute the late Dr. Maurice C. Hall's method for the chapter on "Examination of Feces." Otherwise, this little volume is just about as perfect a handbook as could be devised for its handy size. The reviewer recommends it unreservedly for the purpose for which it is intended. E. A. R.

PRINCIPLES AND PRACTICE OF BACTERIOLOGY. Arthur H. Bryan, M.A., V.M.D., F.A.P.H.A., and Charles Bryan, M.D., F.R.C.S. 1st edition. 267 pages, with 11 reference tables, 12 illustrations and 101 figures. Barnes & Noble, Inc., New York, 1938. Cloth, $2.25.

This handbook on bacteriology, designed primarily for the bacteriologist in the human field, presents a concise, concrete and practical reference guide and text for students and workers in both the theory and practice of bacteriology. While no originality is claimed for its content, the unique plan of organization should be of inestimable value to users of the book.

One important innovation of this book is that many subjects ordinarily supplying material for separate exhaustive books have been condensed and included under one cover. Students and workers in bacteriology are usually concerned with compara-

tively few important species of microörganisms and these have been adequately described. The last topic in each chapter of descriptive bacteriology includes the names of related or allied organisms.

It is the opinion of the reviewer that the veterinary student and practitioner will find that the acquisition of this handbook on bacteriology is money well spent, for the authors and publishers have not overstated facts in claiming that this quick reference book presents a concise, concrete and practical reference guide. It is all of that, the reference tables, illustrations and figures being particularly valuable to the profesional man whose time is limited.

E. A. R.

LES PRIMIÈRS PAS DU VÉTÉRINAIRE (The First Step of the Veterinarian). Dr. Pierre Escande, Honorary President of the Syndicat des Vétérinaires de Seine-et-Marne, France. 120 pages. Vigot Frères, Paris. 1937. Paper.

This is a manual intended to guide the veterinarian on entering the field of practice after graduating. In short, an effort to round out a veterinary education in 120 pages of reading matter, obviously based upon the presumption that the college course is characterized by omissions of fundamental significance. The paragraphs on the behavior of the new practitioner toward his colleagues, and more especially *vice versa*, are delightful reading as are also his relations with dealers in animals and insurance companies, but all of this belongs in the curriculum of the clinical branch. The advice never to speak ill of a colleague is always sound reasoning, because, as the author points out, it is but speaking ill of *l'un des nôtres* (one of our own kind) and in regard to the conduct of a practitioner toward dealers, he prescribes precisely the right course to pursue, namely, "Be fair to both sides" without sacrificing one's mental stability.

In regard to entering actively into politics, the young man is advised to devote all of his time to his vocation, but the author admits that a representative of the veterinary profession in legislative bodies has its advantages. The good veterinarian or physician is the one who is always at hand at the call of his clients, morning, noon and night. There is no substitute for prompt service. While all this advice is *au fait* in every respect, it is a sermon more needful among the older practitioners than the new ones just entering practice. The book should be named, 'The first and last step and all steps in between."

A succession of paragraphs on teaching owners to call before it is too late, on recognizing incurables, tetanogenic wounds, tuberculosis, Bang's disease and other pitfalls of clinical work in cows, sheep, dogs, fowl and rabbits, and on keeping informed on standard methods, are as faultless as they should be unnecessary for the well-taught graduate.

In the chapter on the horse, there are short sketches on colic, azoturia (hemoglobinura), lymphangitis, liver and pulmonary affections, tetanus, founder, canker of the feet, mange, periodic ophthalmia, cold abscess of the shoulder, helminths, bots, inappetence, emaciation, administration of medicine, warts, castration, hernias, docking, lampas, roaring, and nail punctures. The chapter on cattle gives advice on foot-and-mouth disease, indigestion, pneumonia, mastitis, pox, verminous bronchitis, actinomycosis, hypocalcemia, calf scours, keratitis, contagious abortion, retained afterbirth, inversion of the uterus, castration of bulls, and spaying cows. Of dogs and cats, distemper, eczema, otitis externa and worm parasites are the diseases upon which attention is focused.

Strongylosis and mortality in lambs are the author's chosen subjects. For swine, rickets, pneumo-enteritis, swine erysipelas, castration of boars and the spaying of sows are pointed out for attention by the novitiate. In fowl, cholera, typhoid and gapes are the only diseases mentioned for the edification for the young man entering rural practice.

The book terminates with an "Eulogium of Pasteur" covering 10 pages, fine reading, and true but foreign to the subject of the book.

L. A. M.

ANATOMIE RÉGIONALE DES ANIMAUX DOMESTIQUE. Deuxième Edition. Equidés, Cheval, Ane, Mulet. Fascicule IV. Région Abdominale, Membre Postérieur ou Pelvien (Regional Anatomy of Domestic Animals. 2nd edition. Equidae, Horses, Asses, Mules. Number IV. Abdominal Region. Posterior or Pelvic Limb). E. Bourdelle, Professor of zoölogy, *Museum National de'Histoire Naturelle*, Paris, and C. Bressou, Professor of Anatomy and Director *l'Ecole Nationale Vétérinaire d'Alfort*. 976 pages. Well illustrated text. Baillière et Fils, Paris. 1937. Paper bound.

Professor Bourdelle, formerly anatomist at Alfort and, his successor, Professor Bressou now occupying that chair, in addition to serving as director of that famous veterinary school, in adding this contribution to the literature of the hour, are both entitled to the profound admiration of the veterinary profession of all countries. The book is a revision of that section of Bourdelle's famous works on veterinary anatomy, which include a volume on the anatomy of ruminants, and one on the anatomy of swine, published at different times during the last 20 years.

To review this work *in toto*, covering all of the minute details it contains, would be an endless task. Even though a worthy review were attempted, it would be too extensive to cramp into close quarters. The anatomical works of Bourdelle and his junior authors are distinguished from the conventional types in remaining faithful to the name "regional" which at Alfort characterizes the method of teaching that branch of the curriculum. The method is known there as "Bourdelle's hobby," because in his classroom work, Bourdelle largely ignores the physiological apparatus to dwell upon the physical constitution of the given region. To him, the finest understanding of an apparatus, from *caput* to *cauda*, has less practical meaning than an accurate knowledge of the complete makeup of the given region.

In speaking of the xyphoid cartilage, for example, Bourdelle would want his students to know at once that here lies the floor of the reticulum where wire and nails collect and penetrate. Where? Through the diaphragm and pericardium lying adjacent. That example tells more of the man and the book than any reviewer seeking here and there for possible errors to no good purpose. In leafing through this particular section of nearly a thousand illustrated pages of excellent paper and type, one immediately falls in with the author's objective.

The illustrations, many of them in two colors, are in themselves a liberal education in the anatomy covered by the section. In hastily searching through the first edition to make comparisons with the second, one finds but little change in the text. New illustrations have, however, been added. The illustrations are not of the usual sort. In fact, they are more revealing, perhaps, than mounted specimens.

The book is in French, but inasmuch as terminology is much the same in all languages, this book is useful for anyone who appreciates a transcendental work on the subject.

L. A. M.

LES VÉTERINAIRES DEVANT L'OPINION PLAIDOYER POUR UNE PROFESSION MÉCOMMUE. (The Veterinarians Before Public Opinion. Plea for a Misunderstood Profession). Paul-Marie Aragon. 146 pages. Vigot Fréres, Paris. 1938. 20 francs.

The author of this book is Doctor Dedieu, director of the municipal abbattoirs of Montpelier, formerly assistant professor of zoötechnics at the *École Agriculture de Monpelier*. Doctor Dedieu, writing under the known *non de plume* shown above, has written a fine essay telling the truth about the veterinary profession's misfortune in being neither well understood nor appreciated except now and then by a laudable few. In effect, the misunderstanding is widespread, as was shown in a previous article entitled "The Veterinarian as Seen by the Litterateurs" touching upon the same subject.

Dedieu, whom some call a pessimist, invites his readers to be the judges and to weigh the evidence around them in the form

of indifference, misunderstanding and even downright attacks by thoughtless writers upon the operations of the veterinary profession. In citing an instance in which the veterinarian was called a self-conceited orator trying to make an impression of his importance, the author recalls the difficult opposition the American veterinarian had to break through at the beginning of the bovine tuberculosis eradication program. "But," says Dedieu, "there are more serious developments hindering the advancement of our profession and these are the importance of signalizing the social progress it has made and pointing out its contributions to science for which it seldom received just moral reward, notwithstanding the fact that some of them, from time to time, have astonished the world." Public opinion is repugnant when it thinks of us as animal doctors incapable of being *savants* in medicine and it juggles the appelation offensively without shame when convenient to invoke the ambiguity of the term to be more insulting.

This book surveys the services rendered by veterinarians in the economic and social order, their conquests in the military service, not mentioning the wealth it has donated to the development of this civilization, often at their peril in the tropics where it aided in expanding the influence of Europe. The text is sincere, based upon truth but perhaps a bit late, since at this hour the veterinary profession *is* being recognized in the world of science and many of its personnel occupy high positions in that realm. A book printed at this time, deploring the low rating of our profession is speaking from the dais of days that are rapidly passing away and giving way to a real understanding of the work of veterinary science which is more applauded than discounted at this moment. What the author fails to point out is that the veterinary profession is living down, not so much a misunderstanding of the qualifications and moral conduct of its personnel, but more particularly the too general underestimation of man's dependence upon the health of domestic animals. Only the snob, the thoughtless, the ignorant and the near great go back to the nineteenth century for mud to throw at the veterinarian of this day and to these we can be charitable enough to pity rather than to hate.

L. A. M.

REVUE GÉNERALE DES FERRURES CONTRE LES GLISSARDES. (Shoeing Against Slipping. A General Review). Maurice Sarrier. 44 pages, 98 figures. Vigot Freres, Paris. 1938. Paper Booklet.

Since new books on horse shoeing have not been published recently, a manual covering any phase of that subject is an interesting curiosity. This is particularly true when the new book deals with the kind of shoeing that will maintain maximum surety for civilian and military animals traveling the long stretches of highways constructed only for the convenience of mechanized transportation and which thus impose upon riders and drivers of horses and mules an entirely new problem in shoeing.

The iron shoes of the past, with their usual heel and toe calks are ill-suited for the cement, asphalt and oiled highways now interlacing the terrain of the principal countries. They must be replaced by types of shoes that will hold on slippery pavement in order to step up traction and keep riders from breaking their necks through the least abnormal action on the part of their mounts. Cavalrymen who have had recent experiences in military manouvers feel that their branch of the service has been disarmed by the character of the modern highway. Farmers no longer attempt to do their cartage with animals for the same reason. It can not be done with unshod feet nor with iron shoes when pavements are slippery with fog, rain, snow or ice. One of the remedies is to change the material now used for making horse shoes.

The author, with 98 excellent illustrations and a descriptive text, tells how this can be done. The booklet describes all-iron shoes with new types of gripping surface, fused-rubber and iron types, pneumatic cushioned shoes, rubber padded heels and frog styles, removable calks and other methods, all showing unexcelled ingenuity.

L. A. M.

MISCELLANEOUS

Government Trailer Laboratory

Supplementing notice published in the September issue of the JOURNAL that the first government built trailer to be used as a laboratory in the control of Bang's disease has been assigned to Michigan, we are showing herewith two views of the trailer in question. One shows the interior arrangement and the other shows how the trailer looks when attached to a government automobile. We are able to show these pictures through the courtesy of Dr. C. H. Hays, inspector-in-charge, who furnished the photographs from which the cuts were made. This trailer outfit was purchased by the U. S. Bureau of Animal Industry and delivered to the Michigan station for use on July 1, 1938.

Fig. 1. Government trailer laboratory with B. A. I. automobile.

Figure 1 is self-explanatory. Figure 2 represents a photograph taken from the front, showing a rear view of the laboratory trailer where the table cabinet, which is used in making blood tests, is set up. There are two places for workers engaged in applying these tests. The table top is made of glass, under which a light is placed for each worker, which serves as indirect illumination for reading the tests. An electric switch box, operated by pressure of the knees is furnished in a convenient place for turning the lights on or off. The supply of plates for setting up the tests will be noted in the box on the top of the table. To the right and left of the space occupied by the operator are shelves in which wooden frames containing blood samples can be stored. There are two of these shelf spaces and below these are cabinets with drawers. The table tops and work bench are covered with linoleum, as is the floor.

According to Doctor Hays, this arrangement for testing areas in the northern counties of the state of Michigan is proving most satisfactory. To date, since work under this plan was commenced in October, 1937, at which time he was using an improvised laboratory in a regularly equipped trailer, he has tested all of the herds in eleven different counties and is now engaged in the twelfth. Eight veterinarians and one helper make up the personnel handling the test from the trailer displayed in these prints. The equipment provided would be sufficient for adding a technician to assist in increasing the volume of tests that could be added. There are many ad-

vantages in the use of the trailer laboratory under the conditions Doctor Hays is confronted with, he says. One of the greatest advantages is its mobility, making possible quicker and more accurate reports. Difficulties with hemolysed serum is a thing of the past. Of equal importance from an efficiency standpoint is the larger number of tests that can now be made. Doctor Hays advises that he will be very glad to give any further information that he has regarding this setup.

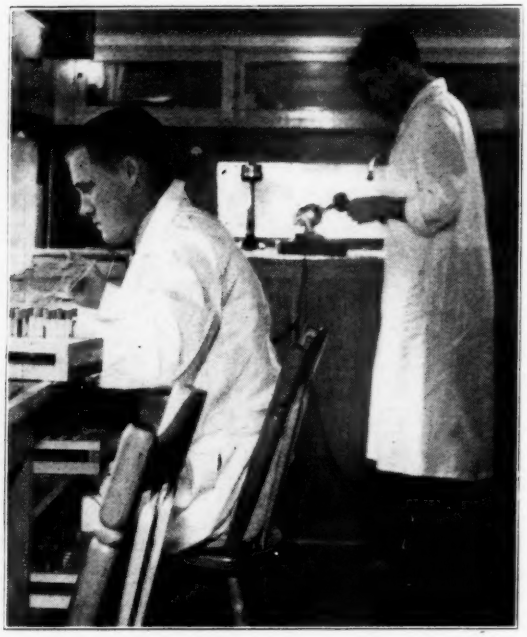

Fig. 2. Trailer laboratory, interior view.

Banting Research Foundation Report

Science is the source of our information that during the year 1936-37, 24 papers of scientific interest were published, reporting results of research carried out under grants made by the Banting Research Foundation of Canada. The purpose for which the grants were made, research workers and the institutions where the work was done is given below for the benefit of our members who may desire to secure further details regarding subjects of special interest.

B. F. Crocker, University of Toronto, did work on a new method which is being employed for the study of the process of digestion in dogs and satisfactory progress is reported; Dr. E. R. Grant, McGill University, on the cause of otosclerosis; A. W. Ham, University of Toronto, a valuable research was carried out on the changes in joint cartilege produced by vitamin C; Mrs. H. T. Mallory and K. A. Evelyn, McGill University, on the determination of bile in blood, using the new photoelectric colorimeter; B. Schachter, University of Toronto, on purification of the gonadotropic substance in human pregnancy urine; Drs. R. F. Wilkinson and R. G. MacKenzie, University of Toronto, a clinical study of the prevention of thrombosis in man by means of heparin and Dr. B. Chown, University of Manitoba, on some types of kidney diseases which are probably due to an excess of mineral secretion.

Do you contribute articles for the

JOURNAL

of your Association?

INTOXICATION DU CHIEN PAR LE TABAC (Tobacco Poisoning in the Dog). M. le Dr. Brossiere. Recueil de Médecine Vétérinaire, cxiv (1938), p. 35.

A dog 20 months old refused food, lay about in a melancholy state most of the time and showed little inclination to move about. The respirations and heart action were accelerated and violent. The temperature was normal. While walking about 30 yards, the dog micturated a highly colored urine several times. There was no improvement after 48 hours. The heart remained tumultuous. Spells of vomiting appeared. Interrogated, the owner stated that the dog had the habit of eating cigar butts from the cinders of the garden, sometimes eating as many as 15 to 20 during a day. A profuse diarrhea developed on the fourth day and lasted five days when the dog began to eat and to recover. In 1931, Tapernoux reported a similar observation in two dogs. One, poisoned with nicotine, presented a history of hiccough, trembling and death.

The treatment consisted of hot wraps, injections of camphorated water and digitalis continued for two weeks which relieve the alarming symptoms presented at the onset of the trouble.

L. A. M.

RESEARCHES ON THE ACTION OF THE OIL OF PINE. E. Darzin, University of Riga. Annales de l'Institute Pasteur, lxi (1938), pp. 172-186.

The product known as oil of pine is obtained by distilling the extract of pine wood derived from various species of pine trees (*Pinus*). It is a yellow liquid, clear or brownish in color, liberating the specific odor of pine. It contains alcohols, terpineols (tertiary alcohols), esters, hydrocarbons, phenols, acetic acid, water and the residue of distillation in proportions varying according to the source; American, French, Litavian. As to the alcohol-terpineol content of these three, the French stands first with 96 per cent, American second with 91 per cent and Litavian third with 62.12 per cent. In phenols, the American contains 1 per cent against none in the other two, but in esters the Litavian ranks highest with 6.54 per cent against American 2 per cent and the French, none. These facts have importance in showing the variation in their respective medicinal values.

The author determined the microbiocidal values of oils of pine by well conducted experiments with *B. coli, B. subtilis,* staphylococci and acid-resistant types. Against Koch's bacillus, only chaulmoogra oil (non-volatile) gave a better account of itself on solid media. Other nonvolatile oils (vaseline, olive oil) do not stop growth on such media. Oil of pine, on the contrary, shows a marked microbiocidal power when checked against other oils. Its microbiocidal power is credited to the action of terpineol whose molicular structure is analagous to that of chaulmoogra oil.

In vivo, oil of pine inhaled produces macroscopic signs of pulmonary sclerosis and intense connective tissue proliferation, attesting to its stimulating action upon the cellular elements of connective tissue. Moreover, tuberculous guinea pigs treated with inhalation of pine oil vapor showed fewer tuberculous nodules than the controls and they lived longer. Quoting *verbatim*: "It seems that inhalation of oil of pine interrupts the multiplication of Koch's bacillus and stimulates a defensive and reparative reaction of the infected connective tissue of the lungs."

L. A. M.

WESTERN MICHIGAN VETERINARY CLINIC

The annual Western Michigan Veterinary Clinic was held at the Ionia Fair Grounds, Ionia, Mich., on July 28. The weather being ideal, there was a record attendance, including representatives from New York State and Texas.

After lunch, a short business meeting was held and the clinic followed. The program was filled to capacity with very interesting cases.

A few of the more interesting operations were six monorchids performed by Dr. C. D. Smith, of Standish and Dr. DeTray, and one cryptorchid performed by Dr. F. E. Meyers. Among the six monorchids was one seven year old colt with one undescended testicle. When the colt was a two year old, one testicle was removed and the other was partially emasculated. Under the capable hands of Dr. DeTray, the testicle was removed and the above condition determined.

Dr. Meyers and Dr. Chas. Haasjes, of Shelby, also performed a very interesting removal of a dentigerous cyst from between the lateral aspect of the orbit of the left eye and ear.

Dr. Hansen might well be termed a capable assistant to the clinicians, for without his casting harness and the cleverness with which he handled it, we could not have expected such wonderful restraint and ease of operation. Dr. P. H. Starr demonstrated very capably the manipulation of a plain rope 50 feet long into a perfect casting harness for Dr. Meyers to perform a cryptorchid operation.

Two fistulas were prepared for treatment by Dr. C. D. Smith, which were of long standing and upon which it was not considered advisable to operate.

Dr. DeTray suggested the following formula for fistula of the withers, from which he reports very good results. Potassium iodide, ½ pound; charcoal, 1 pound; arsenic powder, 2 pounds; copper sulphate, 5 pounds; iron sulphate, 5 pounds, and sulphur powder, 11½ pounds.

The following names were submitted for membership: Drs. W. H. Michand, of Beaverton; H. H. Ruhland, of East Lansing; Nelson Howe, of Saint John; C. D. Smith, of Standish; W. W. Hyde, of Wellington, Ohio; C. E. Stone, of Penn-Yan, N. Y.; C. N. Brookens, of Mount Pleasant; C. R. Blatchford and M. M. Stiles, of Battle Creek.

There was an enjoyable dinner, which was attended by over 100 veterinarians and their wives.

H. C. McCORMICK,
Secretary and Treasurer.

VERMONT VETERINARY MEDICAL ASSOCIATION

The summer meeting of the Vermont Veterinary Medical Association was held at the Hotel Windham, Bellows Falls, on August 5, 1938.

President David Hopkins, of Brattleboro, called the meeting to order. After a short business session, Dr. Seth Johnson, from Cornell University, Ithaca, N. Y., gave a paper and demonstration on mastitis. Shortly after noon, the village president, Austin Chandler, welcomed the members of the Vermont Association to Bellows Falls.

Commissioner of Agriculture, Hon. E. H. Jones, of Montpelier, gave a resumé of Bang's disease, past and future. Dr. E. W. Robinson, Bellows Falls, gave a paper on "Heart Worm in Canines." Dr. Harold L. Watson, of Montpelier, presented "Coccidia in Canines," and Dr. C. C. Ellis, pathologist at the laboratory, Montpelier, talked on "Work Done in the New State Laboratory."

A banquet was held in the private dining room of the hotel. Music and entertainment was furnished throughout the dinner by local talent, but the final joy of the day came in the after-dinner talk by Frederick Van de Water, author and writer, of Dummerston.

G. N. WELCH, *Secretary-Treasurer.*

NECROLOGY

AUGUST H. HOLKENBRINK

Dr. August H. Holkenbrink, of Saint Joseh, Mo., died August 17, 1938, at the Missouri Methodist Hospital, after an illness of only a few hours.

Born at Saint Joseph, February 9, 1889, Dr. Holkenbrink attended the Saint Joseph Veterinary College and was graduated with the class of 1910. He immediately entered practice and was first associated with Dr. F. M. Cahill, then later he, with his twin brother, established a veterinary college and hospital. The college was discontinued, but the hospital continued in existence.

Dr. Holkenbrink was active in civic affairs, having served continuously as a member of the city council for a longer time than any other person. He was elected in 1926 for the first time. After serving two terms, he was appointed for a full term by the mayor and was the only person who ever served a full term on the council by appointment. He was again elected to the council last spring and was made president.

Dr. Holkenbrink joined the A. V. M. A. in 1917. He was a member of the Twelfth International Veterinary Congress, a 32nd degree Scottish Rite Mason, a member of Saint Joseph Blue Lodge, A. F. and A. M.; of Moila Shrine of Saint Joseph Chapter, O. E. S. No. 198 and the Elks. He was a member of the Humane Society Board and a director of the Park Bank. He is survived by his wife (nèe Iona Dell Madison) and two brothers.

CAPTAIN RAY S. HUNSBERGER

Captain Ray S. Hunsberger was killed in an automobile accident, September 4, 1938, in the vicinity of Camp Perry, Ohio, while he was on temporary duty in connection with the National matches.

Born at Souderton, Pa., November 3, 1910, Captain Hunsberger was graduated from Cornell University with the class of 1934. He was appointed to the rank of second lieutenant in the Veterinary Corps, December 1, 1934, and ordered to report to the Medical Field Service School, Carlisle Barracks, to undergo a course of instruction. His first station assignment was at the Presidio of Monterey, Calif. On August 1, 1935, he was promoted to the rank of first lieutenant. He attained his captaincy December 1, 1937. Captain Hunsberger returned from a tour of duty in the Philippine Department, June 1, 1938, and was assigned to the Army Medical School, Washington, D. C., for a course of instruction in the Army Medical School and was on temporary duty at Camp Perry at the time of his death. Captain Hunsberger joined the A.V.M.A. in 1937.

CLARENCE C. MILLS

Dr. Clarence C. Mills, of McNabb, Ill., died August 29, 1938, after a short illness.

Born February 5, 1869, Dr. Mills was graduated from the Chicago Veterinary College with the class of 1890 and had practiced veterinary medicine for a period of more than 25 years. At one time, Dr. Mills served as assistant state veterinarian for several years. Although he had not been active in the practice of veterinary medicine for some time, he had kept in touch with the activities of the profession and often assisted his friends when his services were needed.

Dr. Mills joined the A. V. M. A. in 1892. He is survived by his wife (nee Dora M. Wilson), three daughters, four brothers.

RICHARD ALLEN GOODMAN

Dr. Richard A. Goodman, of Wichita Falls, Texas, died July 2, 1938, of coronary thrombosis at the age of 32 years.

Born December 6, 1906, at New Albany, Miss., Dr. Goodman was graduated from the Texas A. & M. College with the class of 1932. For a short time following graduation, he was assistant veterinarian at the Texas Agricultural Experiment Station. He then entered the service of the U. S. Bureau of Animal Industry and was stationed in New York City as meat inspector. At the time of his death Dr. Goodman was associated with his stepfather, Dr. L. I. Lucey (Chi. '15) in general veterinary practice. He served as first lieutenant in the Veterinary Reserve Corps of the Army Veterinary Service, and for a number of years had been active in National Guard affairs.

Dr. Goodman joined the State Veterinary Medical Association of Texas in 1932, and the A. V. M. A. in 1935. He is survived by his widow, mother and stepfather.

JAMES W. BECKWITH

Dr. James W. Beckwith, of Shullsburg, Wis., died suddenly, August 15, 1938, while engaged in conducting his practice.

Born at White Oak Springs, Wis., May 1, 1874, Dr. Beckwith attended the Chicago Veterinary College and was graduated with the class of 1902. Immediately after his graduation, he started the practice of veterinary medicine, which he had conducted for 36 years over a very large territory. He was considered an authority in his work.

Dr. Beckwith served as chairman of the town of White Oak Springs and was also chairman of the county board. Later, he became mayor of the city of Shullsburg and many improvements were made under his tenure of office.

Dr. Beckwith joined the A. V. M. A. in 1916. He is survived by his wife, three daughters, one sister and two brothers.

J. S. H.

ERNI V. ROBNETT

Dr. E. V. Robnett, of Oklahoma City, Okla., died August 26, 1938, after a brief illness.

Born at Waco, Texas, September 17, 1867, Dr. Robnett was graduated from the Kansas City Veterinary College in 1902. At one time he was employed by the U. S. Bureau of Animal Industry. He had served as state veterinarian of Oklahoma for eight years. When death overtook him, he was engaged in general practice.

Dr. Robnett joined the A. V. M. A. in 1917. He was a member of the Oklahoma Veterinary Medical Association.

HERBERT MURPHEY

Dr. Herbert Murphey, of Salisbury, Md., died at his home of kidney complications. Dr. Murphey was a graduate of the University of Pennsylvania, class of 1910. He is survived by his wife and seven children.

S. E. HOGE

Dr. S. E. Hoge, of Varna, Ill., died at the Passavent Hospital, August 14, 1938.

Born at Winona, Ill., August 14, 1890, Dr. Hoge was graduated from the McKillip Veterinary College, with the class of 1912. Following graduation, he entered veterinary practice at Varna and continued until about a year ago, when his health failed. Dr. Hoge is survived by his widow (née Marie Lundholm) and one brother.

D. F. RICHARDSON

Dr. D. F. Richardson, of Hoopeston, Ill., died August 20, 1938, following a three weeks illness. Death was attributed to a kidney ailment.

Born at Rock Island, Dr. Richardson attended the McKillip Veterinary College and was graduated in 1910. He was a member of the Hoopeston City Council at the time of his death.

Dr. Richardson joined the A. V. M. A. in 1928. He was a member of the Illinois State Veterinary Association. Dr. Richardson is survived by his widow, three sisters and one brother.

ARMY VETERINARY SERVICE

Regular Army

Captain Bernard F. Trum is relieved from assignment and duty at Fort Oglethorpe, Ga., effective in time to comply with this order, is then detailed as a student under the provisions of section 127a, National Defense Act, as amended, for the purpose of pursuing a course of instruction in animal breeding and clinics under Dr. W. W. Dimock at the University of Kentucky, Lexington, Ky. At the proper time, Captain Trum will proceed to Lexington, and report on, or about September 1, 1938, to the registrar, University of Kentucky, for duty, and by letter to the Surgeon General and the commanding general, Fifth Corps Area. He will also report to the officer in charge, East Central Remount Area, Lexington, Ky., for additional duty.

Lt. Colonel Charles S. Williams is relieved from assignment and duty at Fort Knox, Ky., effective on or about September 15, 1938, and directed to proceed to Fort Sam Houston, Texas, and report for duty.

Lt. Colonel Stanley C. Smock is relieved from duty at Fort Lewis, Wash., effective in time to proceed to San Francisco, Calif., and sail on transport scheduled to leave that port on or about October 18, 1938, for New York, N. Y., and upon arrival thereat, will proceed to Madison Barracks, N. Y., and report for duty.

First Lieut. Benj. F. Leach, Fort Sheridan, Ill., is directed to proceed on or about September 15, 1938, to Fort Knox, Ky., for temporary duty for a period of approximately four months, upon completion to return to his proper station.

First Lieut. Lloyd C. Tekse, Presidio of San Francisco, Calif., is detailed as transport veterinarian to accompany the shipment of animals on the USAT Meigs scheduled to sail from San Francisco Port of Embarkation, Fort Mason, Calif., on, or about September 20, 1938, for Hawaii and the Philippines, and return to San Francisco. Upon completion of this duty, he will return to his proper station.

Lt. Colonel Fred W. Shinn, Fort Francis E. Warren, Wyo., is directed to proceed to Fort Douglas, Utah, on or about August 1, 1938, and report to the officer in charge of the Northwestern Remount Area for temporary duty for approximately two months and upon completion to return to his proper station.

The promotion of the following-named officers to rank from date opposite their names is announced:

To Major

Captain Stanley M. Nevin, August 4, 1938.

To Lt. Colonel

Major Gardiner B. Jones August 11, 1938.

Veterinary Reserve Corps

PROMOTIONS

To Major: John Warden Burke, 337 Kenwood Ave., Dayton, Ohio.

To Captain: Henry Vance Lewis, 2027 Davie St., Davenport, Iowa.

To Captain: Alvin Rutti McDonald, 6 Marshall, Hartford, Conn.

NEW ACCEPTANCES

(First lieutenants)

Allen, Robert Oriett, Binghamton, N. Y.
Fallon, Harry Jack, Akron, Ohio.
Morris, Alexander, Jamaica, N. Y.
Morris, Robert Bernard, Jamaica, N. Y.

NEW ASSIGNMENTS TO ACTIVE DUTY WITH CCC

First Lieut. Burton C. Thomson, Fort McPherson, Ga. 1st Lieut. Benjamin F. Ward, Camp Beauregard, La. Capt. Fred I. Hamman, South Texas District CCC, San Antonio, Texas. 1st Lieut. Howard F. Carroll, Presidio of San Francisco, Calif.

TERMINATION OF ASSIGNMENT TO ACTIVE DUTY WITH CCC

First Lieut. Walter W. Fechner, Camp Beauregard, La. 1st Lieut. Ivan Smith, Omaha, Nebr. Capt. Hans Juergen Magens, Fort Leavenworth, Kans.

Talk on Federal Meat Inspection

The JOURNAL office is in receipt of material for a ten minute talk on Federal Meat Inspection, which is intended for use by Bureau of Animal Industry employee's who from time to time may be requested to address local groups on meat inspection. The talk is so well prepared, however, that it would be valuable to any veterinarian who has occasion to address groups on this phase of veterinary activity in the field of public health. As a supplement to the present talk, the Bureau has prepared a film strip (lantern-slide series on a strip of film) showing the manner in which meat is handled (1) in the absence of official inspection and (2) typical scenes in inspected establishments. The film strip contains 42 pictures. This film fits any standard film-strip projector taking 35 mm film.

GLEANINGS FROM OUR CORRESPONDENCE

MARRIAGES

DR. JAMES KRAL (K. S. C. '35), of Augusta, Maine, to Miss Isabel Carey, of Topeka, Kan., at Topeka, July 22, 1938.

DR. LINCOLN G. RUTSHER (.....), of Scranton, Pa., to Miss Isabelle Rose Zuirblis, at Scranton, August 25, 1938.

DR. RAY S. PYLES of Albuquerque, N. Mex., to Miss Ruth McKee, of Maryville, Kansas, on June 26, 1938.

BIRTHS

To DR. and MRS. R. LELAND WEST, of Waseca, Minn., a son, Michael Alan, August 4, 1938.

To DR. and MRS. EARL O. LATIMER, of Roodhouse, Ill., a son, August 25, 1938.

PERSONALS

DR. A. O. TUDOR formerly of Sayre, Okla., is now located at Kingfisher, Okla.

DR. A. R. INMAN, of Visalia, Calif., recently completed a new small-animal hospital.

DR. D. L. SMATHERS (Cin. '14), of Greenfield, Ohio, has opened offices at 332 Lafayette St.

DR. HERBERT E. MILLER has moved from Coral Gables, Fla. to 1801 S. Bayshore Lane, Miami, Fla.

LT. COL. S. R. INGRAM has moved from San Antonio, Texas to 3640 Michigan Ave., Kansas City, Mo.

DR. A. G. BEAGLE reports a change of address from Baltimore, Md., to 501-12 N. W., Mason City, Iowa.

DR. H. L. GEICK reports a change of address from Milwaukee, Wis. to 709 Fowler Street, Waterloo, Iowa.

DR. and MRS. W. L. DRINKWATER (U. S. C. V. C. '19), of Utica, Mich., recently celebrated their golden wedding anniversary.

DR. A. G. GIESKE (Chi. '06), of Barrington, Ill., is constructing a new animal hospital just south of Main street at Barrington.

DR. W. E. JONES (Cin. '15), of Leesburg, Ohio, recently attended an alumni meeting of the Cincinnati Veterinary College, at Cincinnati.

DR. D. L. CASWELL, superintendent of the State Spring Farm, at Mason, Mich., has resigned to enter private clinical veterinary work in Detroit.

DR. W. A. BILLINGS (Corn. '18), of the University of Minnesota, recently appeared on the program of annual Turkey Day, held at Michigan State College.

DR. and MRS. R. D. STEWART (O. S. U. '17), of Willshire, Ohio, recently celebrated their silver wedding anniversary with a reception in the evening in their home.

DR. D. L. CASWELL (Iowa '37) has resigned his position with the Michigan State Game Farm and has entered small-animal practice at 22706 Woodward Ave., Ferndale, Mich.

DR. B. L. LAWLOR (Ont. '35) has purchased the veterinary practice of the late Dr. J. W. Beckwith. Dr. Lawlor was formerly connected with the U. S. Bureau of Animal Industry.

DR. DANIEL I. SKIDMORE (O. S. U. '04), of Washington, D. C., and Mrs. Skidmore, were injured in an automobile accident near Glen Falls, N. Y., while enroute home from a vacation in that state.

DR. H. W. EGGLESTON (Corn. '14), of Alden, N. Y., has recently resigned his position with The Borden Company, which he held for 20 years, and is now engaged in general practice in Alden.

DR. C. J. LANGE (Corn. '32), of Greensboro, N. Car., has resigned his position with the Fraser Veterinary Hospital, Richmond, Va., to establish the Greensboro Veterinary Hospital, at Greensboro.

DR. F. W. ASHE (Chi. '90), veteran racing official of New York City, was appointed steward for the eighty-day racing meet at Lancaster, Ohio. He is aso steward for the meeting held annually at Hot Springs, Ark.

DR. A. G. GIESKE (Chi. '06), of Barrington, Ill., has started construction of an up-to-date small-animal hospital. Dr. Wayne Binns (Iowa '38), who is associated with him, will be in charge of the small-animal work.

DR. I. E. WILSON (Iowa '14), of Virginia Polytechnic Institute, Blacksburg, Va., visited the office of the A.V.M.A. on Saturday, September 10, 1938. Dr. Wilson had just returned from several weeks stay in Alaska.

DR. CHARLES C. DAUBER (Ont. '04), of Sturgis, Mich., suffered a fractured arm and other injuries when his car hit the railing and turned over on a railway two miles east of Centerville, Mich. Dr. Dauber claimed that the lights of another car blinded him.

DR. M. L. CRANS (K. C. V. C. '16), inspector-in-charge, U. S. Bureau of Animal Industry, Marshalltown, Iowa, spent the summer motoring on the Pacific Coast. While in the Northwest, Dr. and Mrs. Crans celebrated their wedding anniversary on the S. S. Alaska enroute to British Columbia and Alaska.

DR. GLENN V. GREWELL (Iowa '24), of Marshalltown, Iowa, attended the national encampment of Veterans of Foreign Wars, at the Columbus, Ohio meeting in August, as a post-commander delegate. Before returning home, Dr. Grewell and family motored east to vacation in Baltimore, Md., and Washington, D. C.